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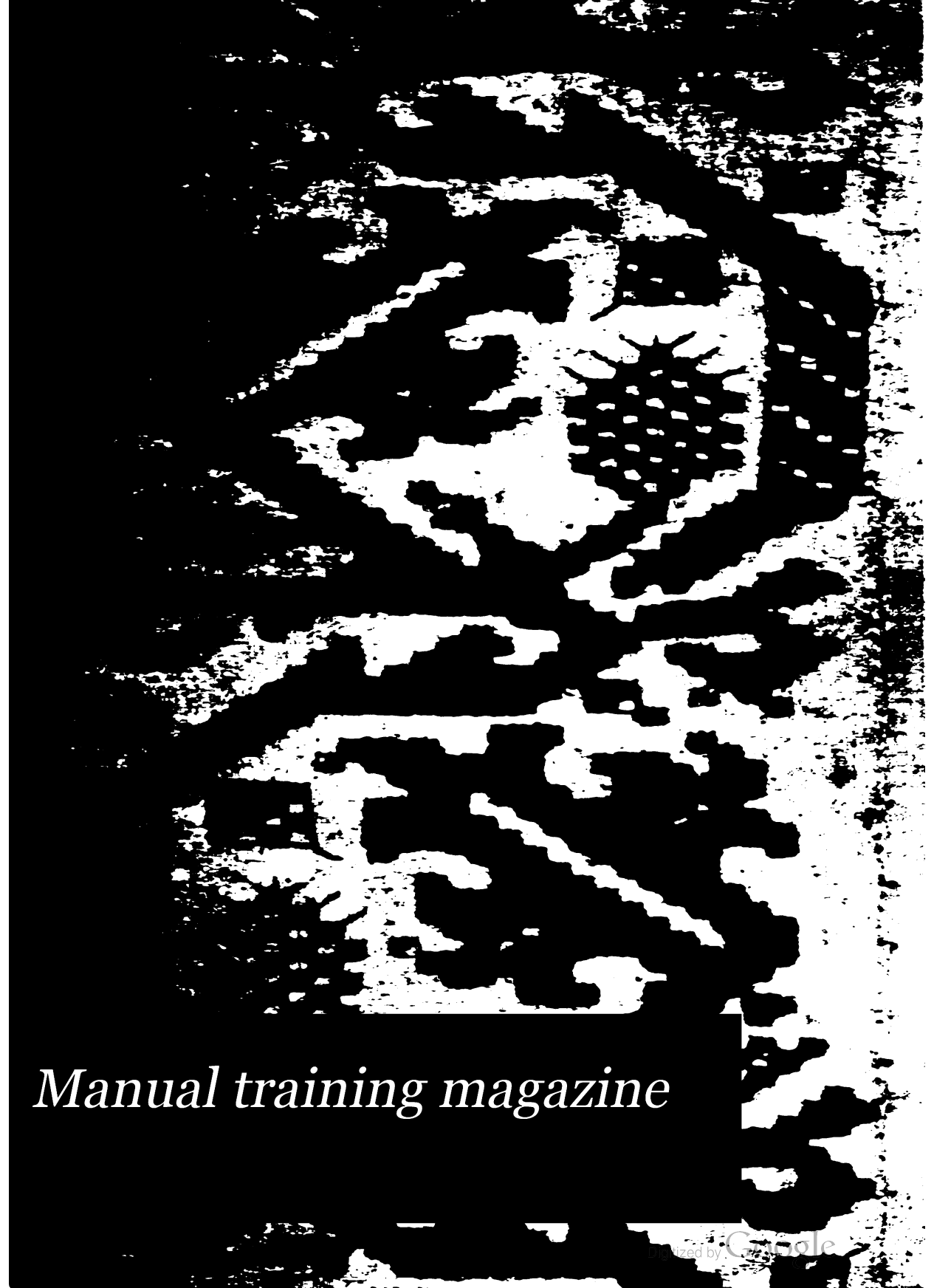

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ASSISTED BY
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MANUAL TRAINING MAGAZINE

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The December Number

For our next number the Editor is especially glad to be able to announce an article by *William Hawley Smith,* the famous lecturer, humorist and author. Mr. Smith has long been a friendly critic of manual training and is well stocked with ideas which ought to be at the service of teachers of manual training.

Cheshire L. Boone, director of art and handwork at Montclair, N. J. will begin a series of illustrated articles covering a complete course in manual training for the elementary schools.

Professor Charles R. Richards of Teachers College will contribute an illustrated article on constructive design which we believe will give the help that many teachers have been seeking.

Dr. Gilbert B. Morrison and *Mrs. Gertrude Roberts Smith* will continue the subjects begun in this issue.

These and several other strong articles are expected in time for the December number.

Our English Headquarters

A reciprocity agreement has just been completed with Mr. J. T. Baily, "Lindum", Spencer Park, St. Albans, England, the business manager of the *Manual Training Teacher,* which makes his office the English headquarters of the Manual Training Magazine and the publications of the Manual Arts Press, while the office of the Manual Arts Press becomes the American headquarters of the *Manual Training Teacher* and the best English books on the manual arts. This agreement has come about because there is a growing interest in our publication in England, and because we believe many American teachers will be glad to keep informed concerning the progress of manual training in England.

The *Manual Training Teacher* is published by the National Association of Manual Training Teachers and, therefore, officially represents the best in English manual training. The subscription price is 50 cents a year. The Manual Arts Press keeps on hand a few sample copies for free distribution and will be glad to send them to prospective subscribers.

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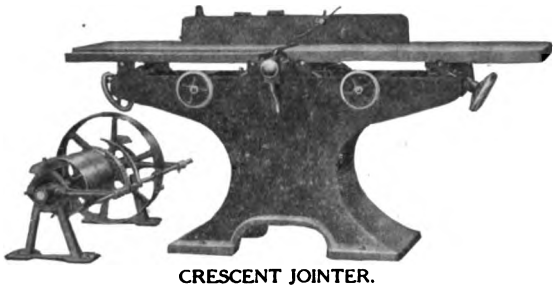

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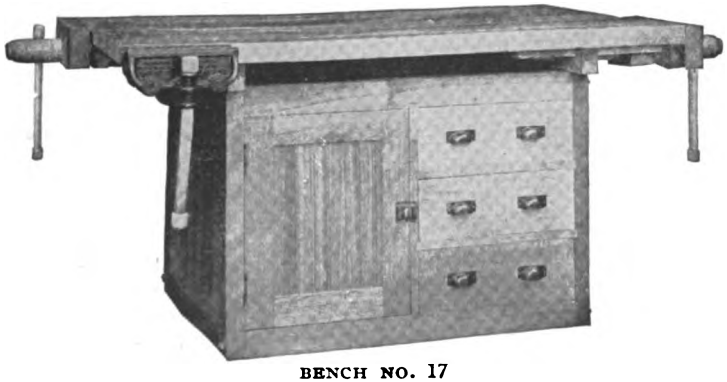

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VOLUME IX. NUMBER 1

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MANUAL TRAINING MAGAZINE

OCTOBER, 1907

THE RELATION OF MANUAL TRAINING TO INDUSTRIAL EDUCATION[1]

CHARLES R. RICHARDS

IN that remarkable book, "Democracy and Social Ethics," Miss Addams says: "The schools do so little really to interest the child in the life of production, or to excite his ambition in the line of industrial occupation, that the ideal of life, almost from the beginning, becomes not an absorbing interest in one's work and consciousness of its value and social relations but a desire for money with which unmeaning purchases may be made and an unmeaning social standing obtained."

Later on, speaking of the worker in the industries, she says: "It is doubtless true that dexterity of hand becomes less and less imperative as the invention of machinery and subdivision of labor proceeds; but it becomes all the more necessary, if the workman is to save his life at all, that he should get a sense of his individual relation to the system. Feeding a machine with a material of which he has no knowledge, producing a product, totally unrelated to the rest of his life, without in the least knowing what becomes of it, or its connection with the community, is, of course, unquestionably deadening to his intellectual and moral life. To make the moral connection it would be necessary to give him a social consciousness of the value of his work, and at least a sense of participation and a certain joy in its ultimate use; to make the intellectual connection it would be essential to create in him some historic conception of the development of industry and the relation of his individual work to it".

When Miss Addams spoke before the Western Drawing and Man-

[1] Read before the Western Drawing and Manual Training Association, Cleveland, Ohio, May 10, 1907.

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ual Training Association at Chicago two years ago she said, in effect, to us, "It is upon you teachers of art and manual training that we must depend for help in this problem. It is you, and you only, that can develop influences that will bring to this army of wage-earners something of true social consciousness, something of joy and satisfaction in their work, something of stimulation toward a larger intellectual life." It seems to me that in these words of Miss Addams is to be found the key to the most significant relation of art and manual training to industry. Yes, further than that, it seems to me that in these same words it to be found much of the deepest meaning of art and manual training for education in general.

During the last twenty years we have made great advances in teaching the manual arts. We have advanced from the abstract exercise where accurate manipulation and tool control was the one consideration, to the model designed to fulfill a useful purpose. We have given increasing play to individual expression in working out the problem of ways and means, and finally we have recognized the inherent demand for beauty in all created things and are bringing design into a natural relation to construction.

This is indeed great progress but it is progress mainly on the side of method of teaching. When we look over our practice today, can we say that in these twenty years any similar advance has been made in the variety of experiences gained or in the scope of ideas presented?

Do we not still select our material of instruction largely upon the single consideration of what children can most easily do with their hands and what will momentarily attract them, with little regard to whether the thing done has any special industrial significance or any large social meaning? And is not the practical test that we continue to apply to our constructive work that of skill rather than that of ideas gained or outlook broadened?

We say that skill apart from the expression of motive and ideas is an unworthy educational ideal and yet can it be claimed that we have given anything like the same attention to the organization of ideas in any broad sense that we have to developing power of manipulation?

But whether we consider the future industrial worker or the boy who enters other occupations, is it not precisely in the extent and quality of ideas gained from manual training that its greatest value resides? In both of these cases is it not in mental quickening and broadening of outlook that we must look for the highest fruits of our subject?

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When we are actually engaged in teaching constructive work even in the higher grades of the elementary school, is not the conviction constantly forced upon us that this is not a period when much accuracy of manipulation or fine muscular control are natural qualities of boy and girl life? And, on the other hand, are we not constantly reminded that it is a period of great sensitiveness of feeling, of much self assertiveness, of great interest in the doings of the real world and of eagerness to participate in the achievements of this world? Can we expect to meet and satisfy this eager craving for information and achievement by anything except the broadest opening up of the real world outside of school and the reflection in the school of facts bigger with meaning than the mere handcraft result?

Skill by itself in the few lines and limited extent possible in the elementary school amounts to very little in industrial value. Even could we develop skill in any one channel to a much larger extent, the lines of modern industry are too diversified to allow of its application.

And on the other hand what is needed more than skill in the industries, the Massachusetts Report tells us, is industrial intelligence—"the power to see beyond the task which occupies the hands for the moment to the operations which have preceded and to those which will follow it, power to take in the whole process, knowledge of materials, ideas of cost, ideas of organization, business sense and a conscience which recognizes obligations".

On the other hand when we turn to the general problem of education is it not this same appreciation and understanding of industry that is most to be desired?

These considerations bring forward the question of the content or subject matter of the manual arts as a distinct problem. As a matter of fact we have been very slow to admit that our field possesses any subject matter at all and the argument is sometimes made that manual training is a form of expression, a phase of child life, and that the subject matter, if it has any, is to be sought in the natural activities of children. This point of view would seem to be a very accurate statement of just half of the problem and to confuse end and means. It ignores the fact that while the nature of the child gives the clue to method of teaching, the subject matter of education is of necessity found in the demands of social life by which the pupil is surrounded and in which he is taking an increasing part. To know how to present our material it is indeed necessary to study the capacities and native instincts of children. In no other

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way can education be made a live process, but the selection of subject matter must needs be found in the world outside of the child in the understanding and control of which he is constantly enlarging.

Another point of view regards manual training as an opportunity to bring out a better understanding of the other subjects in the curriculum, such as history, geography and science. It is indeed true that there are generous opportunities in this direction and surely we have the right to feel that art and manual training have done much during the last ten years to enrich and vitalize the methods of teaching in the elementary school.

But is it enough that art and manual training should serve merely to visualize and enliven the other elements in the course of study? Is it enough to accept these other studies as our subject matter and to regard art and manual training as but methods of instruction—as but a study of form and not of content—as indeed but a handmaid in the service of instruction?

Is it not a serious question whether work that means so much of difficulty and expense will long be tolerated by the tax payer unless it serves in itself to present a content rich in ideas—ideas that in themselves will make possible a better understanding of and more effective participation in our social order? And why, in this age, when industrial problems constitute the gravest problems in our social life and when the dominant forces forming and reforming our society are the industrial, have we the right to hesitate before this question?

Starting with the simplest means of obtaining food, clothing and shelter, the industrial arts have gradually reared the fabric of modern civilization. Is it not at once our opportunity and responsibility to identify ourselves as the representatives in the school of this great field of human activity and to take for our task as teachers the interpretation of the arts and industries of modern life?

This proposition should not be construed in any sense as an argument towards isolation of our subjects from the rest of the school work. On the contrary, the more truly and broadly we connect with real life the more broadly and effectively we should be able to connect with all the other work of the school that is making for an understanding of real life. Nor is such a program utilitarian in its essence. The arts are social in their significance. They make for human progress and betterment. The practice of the arts means social relations and social relations are moral relations. And no study of the arts, when they are approached in their social setting, can be void of the moral element.

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To work out such a program, many years would be needed. We should meet many failures and many half successes and our ideal would lie always beyond us, but in the long run should we not develop an educational instrument of tremendous significance to the day and generation; an instrument that would tend to bring greater meaning, broader outlook and increased social consciousness into the lives not only of those who enter the industries but of those who go forward into other activities?

To move toward such an end as this, the manual training instructor must become more than a teacher of tool processes. Yes, he must become even more than a craft teacher. As the interpreter for the school of the arts and industries, he would work not only through the making of constructive projects, but through the presentation in other ways of many relations and aspects that cannot be embodied in school productions. He would make liberal use of discussion, of drawing and illustrative material, and would not fail to develop some notion of the organization of modern industry, with the significance of its machinery and division of labor and the economic principles involved.

All of this would, of course, have to be done in proper balance. I am far from suggesting that this study of the industries should be largely a matter of talking or of book study. There should always be a just relation between impression and expression. The constructive instinct would always be the key to the situation, and the ideas presented should always focus and find typical expression in constructive form.

We have of late years come to rely almost wholly in our school practice in manual training upon the motive of possession, or as it is put, making something for a useful purpose. We all know that this is a powerful incentive, but is it not a great mistake to conclude that individual possession is the only motive that leads children naturally to constructive effort? As Dr. Dewey has pointed out, the real principle of interest "lies in the recognized identity of the fact or proposed line of action with the self. That it lies in the direction of the agent's own growth, and is therefore imperiously demanded if the agent is to be himself."

With boys and girls in the upper grades of the elementary school this interest may be appealed to by projects of far larger suggestiveness than the individual useful model. If the achievement is felt to mean something of progress toward the understanding and control of things in the real world that are recognized as worth while, there will be no question of interest, and individual or co-operative projects that repre-

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sent the study and working out of industrial types in a purely illustrative way may be made to arouse fully as much enthusiasm and spontaneous effort as the model intended for use in the home.

All those who have worked with children at such projects where the problems were well adjusted and where liberal opportunities were given for initiative and expression have, I venture to say, been struck by the wide range of suggestion, the interest in discussion and the rather surprising store of information displayed. Again and again have students been impressed with the intellectual activity and spontaneity and self-direction displayed by a class working upon the varied details of an industrial project—an activity often far greater than that displayed upon an individual useful model where the demand for mental activity is sometimes limited to the control of a few familiar tool processes.

But many of you will say, "What is the use of attempting all this when so little can be accomplished?" The same question has been asked concerning every innovation in the work of the elementary school. It was asked concerning the introduction of nature study, of drawing, of history, and of literature.

In one sense the result from any study taken up in the elementary school is necessarily very meager viewed from the standpoint of the full development of the subject. We can teach very little mathematics in the elementary school, and yet we are very far from giving up the task. We realize that this instruction is all that over nine-tenths of the boys and girls in the country will ever have the chance to obtain, and furthermore that it is quite possible in this amount of time to give enough appreciation of the subject to meet their practical needs in life. And so it is with this matter of the industries. We can not expect to approach the subject from the standpoint of the engineer, or the expert, or to develop a mathematical and scientific appreciation of industrial methods, but may we not do a great deal to illuminate and expand the point of view of the boy and girl and give them a vastly greater appreciation of this industrial fabric with which we are surrounded?

Let us consider for a moment the concrete case of a mill town where the boys and girls who stop their education with the elementary school go to a very large extent into the mills as operatives. These become the typical factory workers to whom Miss Addams refers. "They handle the machinery day by day, without any notion of its gradual evolution and growth. Few of the men who perform the mechanical work in the great factories have any comprehension of the fact that the in-

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ventions upon which the factory depends, the instruments which they use, have been slowly worked out, each generation using the gifts of the last and transmitting the inheritance until it has become a social possession. This can only be understood by a man who has obtained some idea of social progress."

Let us suppose that during the elementary school experiences of these boys and girls they were brought into contact with different textile materials and allowed to find out something of their character; were shown from actual experiment the different steps necessary to make cloth from the raw material in the simplest possible way; were required to study the problem of improving the first crude methods to the stage of the developed hand spinning wheel and hand loom, and were afterwards taught the meaning of the more important developments in the power machinery of the present day; suppose that they practiced the different fundamental weaves and analyzed the different ways in which the different kinds of cloth are made; that they learned the sources of the world's supply of raw material, the names and positions of the great manufacturing centers and the prices of raw material and of finished product; that they made simple designs for the pieces which they wove and were shown various methods of applying designs to cloth, and examples of beautiful fabrics. Would not these children carry into their future work some appreciation of the meaning of their single tasks that would do something to lift them above the dull routine of their labor, and give them more of the feeling of connection and unity with the world about them? And furthermore, would not such an experience lead to a mental quickening sure to bear fruit here and there in improvements and inventions among these workers?

Does this sound visionary and chimerical? Yet a leading textile manufacturer of New England has said that he believed such training would accomplish more than any other influence that can be brought to bear in broadening the outlook and stimulating the ambition of young mill workers.

Again, many of you will say that this broad program is impracticable under the conditions of the public schools, that while certain things can be accomplished with small classes under favorable conditions, large classes and limitations of space and resources would prevent much of anything being done under ordinary conditions.

There are two points of reply that I would make to these objections. First, that the history of the manual training movement shows nothing

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more clearly than that what is impracticable today is accomplished tomorrow. And, second, that this question of interpreting the industries in the school means more a change of attitude in our teaching than the addition of large projects or expensive materials. Furthermore, much is being accomplished today in this very direction. Highly developed work in the study of textiles, in pottery, in printing, in book-making, and in the study of simple industrial types is already being carried on in typical public schools in several large cities.

The problem is very largely one of selection and organization of material. It is evident that not a great amount in a quantitative sense can be covered in the small time available and that only a study of those industries most fundamental to the existence of society, such as pertain to food, clothing, shelter and those representative of transportation and communication, fall within the possibilities. But it is precisely these industries which represent the material foundations of modern civilization and which are typical in their character of the entire industrial situation of today.

There is another point of view from which this question has a very important bearing upon industrial education and upon education in general. The report of the Massachusetts Commission on Industrial Education brought to the attention of the educational world more forcibly than any other utterance of recent years the tremendous proportion of children who leave the elementary school before graduation. And, it also brought out the comparatively unappreciated fact that the years spent by such children in industrial work before the age of sixteen are for the most part wasted as far as developing future opportunity is concerned. The report also developed the point that the greater proportion of these children, at least in Massachusetts, leave school not because of pecuniary need, but because the work of the school is not sufficiently attractive to hold them, and because they are ambitious to engage in the activities of the real world. To hold these children in school is consequently a grave problem of industrial as well as of general education.

Among all the agencies that can be called upon to make school life more an epitome of real life and to make it a place where this adolescent craving for real achievement will be satisfied is there anything comparable to the opportunities presented by a constructive study of the industries? Is it not pretty nearly true that in the chance of making our constructive work more a reflection of the actual industrial world lies the sole hope of increasing the holding power of the school in these

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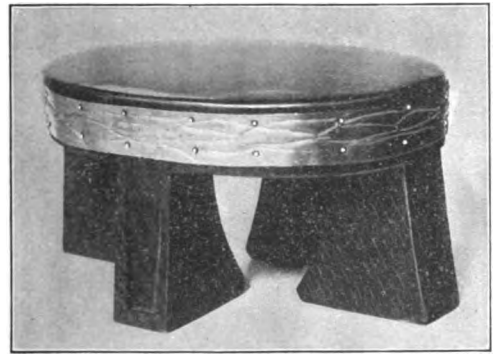
upper grades? Such a result is not likely to be accomplished by mere increase of the usual manual training work. It is rather upon a change of spirit and character that we must build to make this instruction more significant in its practical bearings and more powerful in its appeal to boys and girls of fourteen. Is it not, in short, instruction that is based primarily upon the stimulating power of ideas rather than upon the development of skill that we must rely?

This country today is waking far and wide to the importance of industrial education and is evidencing a tremendous interest in the problems of ways and means. It is without question that many plans and institutions for vocational training will be brought into being in the next few years and yet whatever comes to pass in this direction, it will still be true that the primary and fundamental influences in industrial education, whether it be a question of developing sympathy for industrial careers, of stimulating industrial intelligence or of broadening the social outlook, rest in the hands of us who are concerned with the art and manual training of the public schools.

And if we read our opportunities aright and can make these subjects a reflection of what is of truest and of largest meaning in industrial life, shall we not contribute a real share towards the realization—to again use the words of Miss Addams—of "the democratic ideal (that) demands of the school that it shall give the child's own experience a social value; that it shall teach him to direct his own activities and adjust them to those of his fellows".



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THE PRESENT STATUS OF MANUAL TRAINING IN THE PUBLIC SCHOOLS OF THE UNITED STATES

FRANK W. BALLOU

HOW to adjust the education of the rising generation more completely to the needs of society is one of the educational problems which has always received careful consideration. Interest in manual training for city and village schools during the past fifteen or twenty years, and the more recent interest in agricultural education for rural communities, are the forms of expression which this consideration has taken. These two lines of activity are component parts of the same movement toward providing a more practical education for certain classes of society. This article is the result of an investigation to determine in general the extent to which the demand for a more efficient education through manual training has been heeded by those who prescribe the course of study in our educational system.

Only cities of over eight thousand inhabitants have been considered although the fact has been revealed that a surprisingly large number of smaller cities and villages have manual training in the public schools. Of course, only relative conditions can be shown in such an investigation, yet in view of the fact that over seventy per cent of all the cities furnished data, and that in most cases the results were decisive, the conclusions drawn may be considered as at least approaching exactness. No attempt was made to determine the nature of the work given in the schools of the different cities, nor are any figures available to show the number of schools in which manual training is taught in the various cities; but rather, this article will present a panoramic view of the extent to which manual training is taught, and its place in general in the public school systems of our cities. All statistics from which conclusions are here drawn were furnished by superintendents in reply to questions asked them in a circular letter.

1. INTRODUCTION OF MANUAL TRAINING.

One of the questions asked of each superintendent was, "In what grade was manual training first introduced?" By the statistics it is shown that the custom is to introduce this work for the first time in the eighth grade. There is practically a uniformity in introducing it into

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the first four grades, which represent the primary department. The work in these grades is in most cases "busy work" and by many is not called manual training work. There is a decided advance over the primary grades in the number of cities introducing manual training first in the fifth grade, followed by a gradual increase to the eighth grade. To make this more concrete, it may be stated that sixty-two cities reporting have introduced manual training first in the first grade, while one hundred and sixty-three have thus introduced it into the eighth grade. Not more than half as many cities have introduced it for the first time in the high school.

Those schools which introduce manual training in more than the first year of high school usually introduce it in all four years. There is the greatest difference between the first and second years, because it is customary to introduce it into the first year to give it a trial, and then to extend it into the other grades of the high school. In general, the history of the introduction and extension of manual training is as follows: In most cases it is begun in the eighth grade and gradually extended over the preceding grades; where it is begun in the primary, it is introduced throughout the four grades; in the high school it is introduced for the first time in the first year, and then gradually extended to the later years.

Economic and utilitarian reasons justify the introduction of manual training first in the eighth grade. We will all agree, probably, that manual training consisting of elementary benchwork is not only the most interesting part of manual training work that is to be found in the elementary school, but it is also the most valuable work in manual training offered there. It is to be expected, therefore, that this work would be the first to be introduced where it is not possible, for economic reasons, to put it in all grades. Further, it is placed in the last grade of the elementary schools in order that it may be of service to those boys and girls who will not go beyond the elementary school. From its introduction at this point in the school curriculum, it has been developed and extended until it covers today the whole field of elementary and secondary education.

2. GRADES WHERE TAUGHT.

Uniformity is the word to characterize the extent of manual training in the primary grades in those cities having manual training as only a few cities have it in the fourth grade that do not have it in the first

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three. In fact, the status of manual training, as to number of cities having it in the various grades, is clearly in accord with the facts presented concerning its introduction. In the intermediate school there is more difference between any two grades than is found in the primary. By far the larger number of cities have manual training in the seventh and eighth grades. In comparing the first with the eighth grade, for example, we find that there are more than twice as many cities which have manual training in the eighth grade as there are of those that have it in the first.

The number of cities giving manual training in the first year of the high school outnumbers by thirty-five per cent those giving it in either of the last two years. Many cities have it in the first two years only. There are in the United States twenty-four cities that have special manual training high schools known as "technical", "mechanic arts", or "manual training high schools." Sixty-six per cent of them are to be found in cities of the first class[1], where, of course, the amount of money to expend for such schools exceeds proportionally the amount appropriated in smaller cities. The North Atlantic Section[2] surpasses any other in this respect, having nine cities of the first class with special manual training high schools. There are also two cities of the second class[3] and three cities of the third class[4] that have similar schools.

There are eighty-three regular high schools in cities of the third class alone, in the North Central Section, in which manual training has been introduced, this section surpassing every other section by an overwhelming number. In this same section there is a total of ninety-eight regular high schools in which manual training forms a part of the regular instruction. This is almost double the number of such schools found in the North Atlantic Division, the only section with which the North Central Section should be compared.

3. TIME GIVEN MANUAL TRAINING.

The course of study in the elementary school has been quite definitely determined. After the time is allotted to the fixed studies there is very little unoccupied time which can be devoted to the subject of man-

[1] Cities with 100,000 population or over.

[2] "Sections" or "Divisions" are those used in Report of Commissioner of Education.

[3] Cities with population of 50,000 — 100,000

[4] Cities with population of 8,000 — 50,000

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ual training. This condition makes it impossible to expect that as much time would be given to the subject of manual training in the elementary school as would be given it in the high school where the course of study does not occupy so completely the time of the student.

The time usually allowed this subject is from one to two hours. The time allotted in most cases is determined not so much by the requirements of the subject as by the peculiar conditions in each school and the unoccupied time which can be utilized for this purpose. One hundred and six cities give an hour and a half per week; sixty-eight give one hour per week, and forty-eight allow two hours. These three groups of cities comprise about eighty-two per cent of all the cities reporting. There are cities that give the subject as little time as twenty-five minutes per week. There are four cities that devote four hours per week to the subject; one which devotes five hours, and one, seven hours each week during the year.

The course of study in the high schools throughout the country has been undergoing a great change during the past several years. This change has resulted in the introduction of many commercial and industrial subjects. The course of study in the high school is more unsettled than the course of study found either in the elementary school or in the college. This unsettledness gives rise to the question as to what subjects are of most worth in the high school course. Just what the answer to this question will be is a matter which can be determined only after the careful consideration which the subject is now receiving. In connection with this paper it is pertinent only to say that this elasticity of the course of study in the high school has made possible a great variety of conditions relative to manual training in all classes of cities in every section of the country.

As to the time required for the subject of manual training in the high school, there is no such uniformity as is found in the elementary school. The elasticity of the course has resulted in many differences as to the time given this subject. There are thirty-three cities which give the subject of manual training one and a half hours per week. There are thirty-three cities which give three hours to this subject, twenty-five cities devote two hours to the subject, and twenty cities give four hours a week. Those that allot to the subject two and a half hours are eleven in number. Those that give the subject twice as much time, or five hours per week, are twelve in number. The number of cities that give five hours per week to the subject is twelve. The number of cities that

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give seven hours per week is twenty-five, or five times as much time as the thirty-three cities that give it one and a half hours. There are eight cities not classified above as follows: Two giving thirty minutes per week, three giving forty-five minutes per week, three giving about twelve hours per week.

In general, of course, more time should be given manual training work in the high school than is given to it in the elementary school. The nature of the work, as compared with that of the elementary school, requires more time. The periods of work should be, and in most cases are, longer. Students should have sufficient opportunity to prepare themselves for their work, and some time has to be allowed for the care of the machinery after the work is accomplished. Then, too, the students are better able to apply themselves to the work for a longer time than are those in the elementary school.

The average time given to manual training in the different "sections" of the country varies materially; in the North Central Section among cities of the third class it is about three hours. The average time given to the subject by the same class of cities in the North Atlantic Section is less than two hours. Similarly, in the Western Section the time is almost four hours. In the South Central Division it is less than three hours per week, while in the South Atlantic it is just two hours. In general what is true of the third class cities is almost true of the larger cities.

When manual training shall have earned an unquestioned place in the high school course, then it will be dtermined more definitely what amount of time should be given to the subject. That time, of course, will not be the same for all cities, but surely the variety shown by these figures does not represent the peculiarities of those cities, but rather the unsettled condition of this subject in our public high schools. These unsettled conditions are not to be taken as evidence that we are not making progress, but they show results which are always brought about by any change such as has come over the public high school in our country through the introduction of manual training and allied subjects.

4. MANUAL TRAINING, A REQUIRED OR AN ELECTIVE STUDY?

Of the many significant facts brought out in this investigation, the number of cities that require manual training in the elementary school, is one of the most striking. Statistics show that 89.9 per cent of the

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cities in the country giving manual training in the elementary schools require it of all students.

First, it should be noted that the school authorities feel that the subject of manual training is of too great importance to the elementary school pupil to be made optional. Of course it is to be conceded that students at that age are not as well qualified to determine what is best for them as are the school authorities. Further, these statistics show very conclusively that the course in all subjects, including manual training, is pretty clearly defined in the elementary school and that the school authorities are not willing to sacrifice its equilibrium by haphazard election of studies.

Turning from the elementary school to the high school, we find almost exactly the opposite situation. Out of two hundred and seven cities reporting, that offer manual training in the high school, one hundred and fifty nine of them permit the students to elect such a course. In other words, seventy-seven per cent of the cities permit the students to elect or reject manual training. Whether or not the leaving of this choice to them is a wise arrangement in every case is an open question. I am of the opinion, however, that manual training is of as much benefit educationally to one student as to another, whether that student is to enter the technical course of a university, or whether he is to enter the profession of law or medicine or to go into business. If manual training has the educational value which it should have if properly conducted, and if the present tendency to make it "a trade" is not heeded, I am fully persuaded that all students should be required to take at least the first two years in the high school. The last two years must necessarily take up work of a more technical character, and, therefore, might not be of as much value to the high school student as some other line of work, depending in a large measure upon the future career of the student.

5. IS MANUAL TRAINING THE RESULT OF PEDAGOGICAL OR SOCIOLOGICAL DEMAND?

The statistics in table A are tabulated from the answers made to the question, "Was Manual Training introduced into your schools because the people demanded it, or because the school authorities or some local organization urged its introduction?" It is quite a common opinion that manual training has been introduced into our schools largely because the people demanded it. A glance at this table will certainly disprove any such contention. Nearly every superintendent reported upon this

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TABLE A.

TO SHOW WHO IS RESPONSIBLE FOR THE INTRODUCTION OF MANUAL TRAINING INTO THE PUBLIC SCHOOLS.

	Pedagogical	Popular Demand	Local Organization	Law	Rivalry	Private Citizen	Others
North Atlantic							
First Class	4	2	2	2	.....	2	.....
Second Class	12	4	1	1	1	1	.....
Third Class	58	7	11	2	.....	6	.....
South Atlantic							
First Class	2	.....	.....	.....	.....	.....	.....
Second Class	2	.....	.....	.....	.....	.....	.....
Third Class	12	1	.....	.....	.....	.....	1
North Central							
First Class	4	.....	3	.....	.....	2	2
Second Class	3	2	.....	.....	1	.....	.....
Third Class	85	25	12	1	1	12	.....
South Central							
First Class	.....	1	.....	.....	.....	.....	.....
Second Class	1	.....	.....	.....	.....	.....	.....
Third Class	13	2	.....	.....	.....	.....	.....
Western							
First Class	1	1	.....	.....	.....	.....	.....
Second Class	3	.....	.....	.....	.....	.....	.....
Third Class	15	5	.....	.....	.....	.....	1
Total	215	50	29	6	3	23	4

question, so that relatively the statistics may be considered as authoritative.

Under the column headed "Pedagogical" is to be found the number of answers containing the statement that manual training was introduced because the superintendent or principal or the school board desired it. Under "Popular Demand" is given the number of answers which stated that the people demanded it. Under "Local Organizations" is given the number of cities where organizations other than the school board caused the introduction of manual training. Under such have come women's clubs, business men's clubs, and various other similar organizations. In Massachusetts the law requires the introduction of manual training in cities of over twenty thousand inhabitants, and some superintendents gave that as the reason why manual training was to be found in their schools. It is to be noticed that such cities are few in number. The law has had little effect relative to manual training because no penalty is attached for its non-inforcement. In the next column headed "Rivalry" are noted three cities introduced manual training because other cities near them had manual training. A good illustration of a case of this kind is Erie, Pennsylvania, where manual train-

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ing was introduced in order to "keep up with the times"; but it hardly does that, as will be plainly seen when we consider the fact that only thirty minutes per week is given to the subject.

It is an interesting fact to note that there are many cities where a "Private Citizen" has made possible the introduction of manual training into the high school. In this respect the North Central Division surpasses all others, for there are fourteen cities out of a total of twenty-three that have had some person who was willing to divide his fortune with the city in order that the boys and girls might receive the benefit which comes from manual training.

In looking over this table it should be noted (under "Pedagogical") that there are two hundred and fifteen cities in which the school authorities introduced manual training. This number is sixty-five per cent of the total number of answers which we have received. Fifteen per cent of the answers received are credited to the column headed "Popular Demand." "Local Organizations" come in for eight and seven tenths per cent of the answers, and "Private Citizens" are credited with seven per cent. If we combine all of the answers, aside from those found in the "Pedagogical" column, we find that the "Pedagogical" reasons for the introduction of manual training, over and above the other considerations combined, are fifteen per cent.

If we believe that the school authorities, school superintendents, principals, and school boards, are the proper guardians of the educational work of our cities, and if we are content to allow to remain in their hands the present welfare as well as the future success of our city school systems, then we ought to have the highest respect for their judgment which prompted the introduction of manual training. In other words, we shall have to conclude that they think that manual training is a valuable addition to the educational work of our public schools, for this table leaves no doubt as to just who is responsible for the introduction and extension of this work. Let it be conceded that in most cases the school board of the city, or the superintendent, or the principal, probably had the passive support of the people in the introduction of manual training. Yet even though we admit this, the fact still remains that the party which takes the initiative is the one to which the credit for the introduction is due, and that is certainly the school authorities. Therefore, instead of manual training being in the school as the result of sociological or popular demands, it has found a place in the school because of a pedagogical belief in its educational value.

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6. OBJECTIONS TO MANUAL TRAINING.

In seventy-seven per cent of all the cities answering there have been no objections to manual training work. Many superintendents of these same cities have gone out of their way to state that manual training is enthusiastically supported, and in some cities an extension is even demanded by the people, after the work has been inaugurated.

The largest number of objections that have been raised to manual training are those which relate to the expense of the introduction of the subject into the schools. It will be noted that the question of expense is really only a question of the administration of manual training, and not a question raised against the educational value of the subject as such in the course of study. Without doubt, many of the cities that object to it on the ground of expense would be heartily in favor of it if it could be introduced with as little expense as a subject like history or geography. The objection of expense might be raised against any particular subject which would demand an increase in the pay roll of the school by the addition of teachers. In other words, the economic conditions prevailing in the school which give rise to this objection to manual training, would probably prevent the extension or further development of any subject in the school.

Three per cent of the cities reporting on this question, still consider the subject of manual training to be a "fad", as it was very often called when it was first given a place in the course of study. The small percentage of cities which now look upon manual training as a "fad" speaks well for the change of attitude toward the subject. In most cases, even where it has been considered a "fad", the people, after having learned the value of the subject through experience, have come to demand more of it. In no case has it been discontinued for this reason.

The question of room for carrying on the work was raised by some cities in the North Atlantic Division, but not to any great extent, only three cities having reported that it was a question of room for the introduction of the work. This, of course, is really a question of expense, although it is given as a separate objection.

In Louisville, Kentucky, and in Detroit, Michigan, particularly, labor unions have objected to the subject of manual training in the public schools. This objection of course, has been raised in some other cities, and seems to arise from the ignorance of the laboring classes as to the actual value of manual training, and what it proposes to do. On

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the other hand, it is to be noted in this connection that in the city of Reading, Pennsylvania, it was the labor unions that asked for the introduction of this subject. From this fact, it is evident that they had come to the conclusion that it not only would not interfere with labor, but that it would be for the benefit of the laboring classes of the city to have manual training become a part of the course of study.

The superintendent at San Francisco says, "The work should be concentrated, that is, there should be two or three grammar schools which should be manual training grammar schools, with the proper course of study"; that "under the system of 'local centers' the work is too scattered to make it of the greatest possible value." This objection comes about from the administration of the work of manual training. It is not to be expected that the subject of manual training will find no friction until some definite course has been worked out for it in the curriculum of every city where it is introduced. The establishment of "local centers" in well located schools is a good way, and the common way to introduce the subject. The natural growth and extension of the work in San Francisco will doubtless put manual training into all schools, or at least into enough of them so that this objection of having to send the children too far to these "centers" will be entirely dismissed.

One of the objections to manual training, and one which is perhaps the most legitimate of those which we have to consider, is the fact that it takes time from the other subjects in the school curriculum. The superintendent of schools of Milwaukee, Wisconsin, raises the objection that "there is not time enough for all work required", and also, "it is too far to send seventh or eighth grades to the 'centers' ". The superintendent at Savannah says, "We have no time for it in regular school hours from nine to twelve o'clock; we have it in the afternoon". Several other cities have expressed the same objections. If manual training seriously interferes with the other work of the school, of course this question of time to carry on the work is a serious matter, provided always that this work in manual training is not of equal value with the work which it displaces in the school. However, if manual training is equal in educational value with the subjects which it limits in the course of study, then this objection is not valid. A discussion of this question will have to be deferred until some later time.

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TABLE B.

TO SHOW WHAT OBJECTIONS HAVE BEEN RAISED TO MANUAL TRAINING IN THE PUBLIC SCHOOLS.

	None	Expense	"Fad"	Room	Other
North Atlantic					
First Class	5	5	3	1	1
Second Class	12	1	.....	.....	.....
Third Class	55	22	4	2	.....
South Atlantic					
First Class	2	.....	.....	.....	.....
Second Class	1	1	.....	.....	1
Third Class	12	1	.....	.....	.....
North Central					
First Class	11	.....	.....	.....	1
Second Class	4	1	.....	.....	.....
Third Class	97	18	1	.....	.....
South Central					
First Class	.....	.....	.....	.....	1
Second Class	1	.....	.....	.....	.....
Third Class	10	3	.....	.....	.....
Western					
First Class	2	.....	.....	.....	.....
Second Class	3	.....	.....	.....	.....
Third Class	15	1	.....	.....	.....
Totals	230	53	8	3	4

Attention is called to the fact that cities in the Western group of states, consisting roughly of those states west of and including the Rocky Mountains, with but one exception, report no objection to the subject. This illustrates the fact that the western section of the country stands ready to take advantage of every opportunity which promises improvement. This attitude of "open mindedness" is characteristic of the people of the West, and much of their success in every line of activity is due to this fact. Conservatism should not be allowed to prevail against newly established practices which have received favorable consideration in other sections of the country.

The objections in the North Atlantic Division come largely from the cities of the first and third class. A consideration of the objections found here as compared with the lack of objections found in the West, presents the corollary of the situation stated in the previous paragraph; namely, that the people of the East hesitate to introduce any subject into the course of study the value of which has not been fully proven. This well illustrates the conservatism of the people of the East. This conservatism of the East relative to school matters is the result of a strong sentiment which it will take many years to overcome, regardless of how

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many or how strong may be the arguments used against it. In the East, therefore, it is not surprising that we find every objection raised to manual training that has ever been raised to this subject in any part of the country. Classical training, born of English aristocratic ideals though it was, has long been the standard of all education in the New England and Middle Atlantic states from the elementary school through the university. The fact that manual training has found any place whatever in the cities of the Atlantic Divisions speaks volumes in its behalf.

7. THE EFFECT OF MANUAL TRAINING ON ATTENDANCE.

Each superintendent was asked to state what per cent manual training had increased the attendance in his city among the boys and among the girls, in the elementary school as well as in the high school. The answers to these questions are not as comprehensive as one might desire. Many superintendents replied that it was impossible to tell how much increase of attendance was due to manual training, and how much was due to other causes. That the subject of manual training has increased the attendance seems to be the general opinion of those superintendents who have given the matter consideration. Just to what extent it has done so is a matter almost impossible to determine.

Superintendents of the following first class cities have expressed themselves as indicated:

FALL RIVER, MASSACHUSETTS: "One or two per cent."

NEW HAVEN, CONNECTICUT: "Perhaps 25 per cent among the boys and girls in the high school."

ALLEGHENY, PENNSYLVANIA: "It holds the pupils in school longer."

CLEVELAND, OHIO: "No statistics from which to answer. We feel that high school attendance has been greatly stimulated."

MILWAUKEE, WISCONSIN: "Possibly 25 per cent."

KANSAS, MISSOURI: "Do not know that it has affected it."

LOUISVILLE, KENTUCKY: "Doubled the attendance of boys in the high school."

Of the superintendents of cities of the second class who gave any information on this subject, the following are typical answers:

LYNN, MASSACHUSETTS: "Among the boys in the high school 30 per cent."

PEORIA, ILLINOIS: "Impossible to state, but there is a greater proportion of boys in the buildings in which we have manual training than in those where it does not exist."

DES MOINES, IOWA: "Considerable increase among boys in the high school. Few girls take it in high school."

SEATTLE, WASHINGTON: "We have no statistics but it is the general opinion that it has materially increased the attendance."

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Superintendents of the third class cities did not feel disposed to give as much information relative to this question as did the superintendents of other cities. The answers received from some of these are here given:

BELMONT, MASSACHUSETTS: "Probably not at all, as attendance is compulsory practically for all taking this work in the elementary schools."

NORTH ADAMS, MASSACHUSETTS: "All that we can find room for."

NEWPORT, RHODE ISLAND: "Do not know. However, the boys outnumber the girls in the high school."

AUBURN, NEW YORK: "I am of the opinion that a good many of the boys and girls remain in the school for the sake of Manual Training."

PORT CHESTER, NEW YORK: "Think perhaps it has a tendency to increase the attendance somewhat."

TOWN OF UNION, NEW JERSEY: "Cannot give details at this time; about 10 per cent."

CLEARFIELD, PENNSYLVANIA: "It has been a great help in keeping boys and girls in school."

WARREN, PENNSYLVANIA: "A perceptible change for the better among both boys and girls."

WEST CHESTER, PENNSYLVANIA: "Among the girls in the elementary school a few have continued for sewing, possibly 5 to 10 per cent; among boys in the high school, approximately 20 per cent increase. That is a conservative estimate. Among girls possibly 10 per cent in the high school."

FREDERICK, MARYLAND: "Among boys in the high school, 25 per cent."

ELYRIA, OHIO: "Among the boys in the high school, 5 to 10 per cent."

BLUFFTON, INDIANA: "Among boys in the high school, 25 per cent."

GALESBURG, ILLINOIS: "I cannot say what percentage, but I feel satisfied it has been one and an important factor in increasing the attendance."

ANN ARBOR, MICHIGAN: "No appreciable effect has been produced in this line, but it has had a beneficial effect upon all other work, as to neatness and accuracy."

MUSKEGON, MICHIGAN: "Among boys and girls in the high school about 50 per cent."

SAGINAW, MICHIGAN: "Among boys and girls in the high school say 30 per cent."

JANESVILLE, WISCONSIN: "Among boys in the high school about 50 per cent."

MENOMONIE, WISCONSIN: "Among boys in the high school 50 per cent."

RACINE, WISCONSIN: "This is all conjecture anywhere. Manual training means better schools and that means better attendance."

ATCHISON, KANSAS: "Estimate about 10 per cent."

MOBILE, ALABAMA: "As this is the second year it can not be estimated."

PUEBLO, COLORADO: "Among high school boys 20 per cent."

BALLARD, WASHINGTON: "I believe the number of boys attending the high school has been doubled."

FRESNO, CALIFORNIA: "Among boys in the elementary school 150 per cent; among boys in the high school 50 per cent."

Owing to the recent introduction of manual training in many cities, it is impossible to determine at present just what effect it has had upon the attendance. The superintendent of schools at Racine, Wisconsin, has explained the situation very pointedly when he says, "Manual train-

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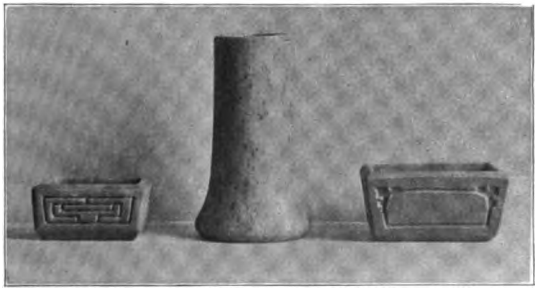
ing means better schools and better schools means better attendance". This principle is illustrated in St. Louis where the superintendent of schools has expressed himself in the following language: "The addition of these two new high schools has demonstrated a very important principle: high school enrollment depends largely upon the facilities offered. Where these are improved and the high schools are placed in various parts of the city so as to be easy of access, the enrollment will increase."

In general, from these statements it will be seen that there is a variety of opinions relative to this matter of attendance. On the whole, it seems fair to say that the superintendents throughout the country are of the opinion that the attendance, especially among the boys in the high school, has been somewhat increased. Where the attendance was good before the introduction of manual training, one would expect to find very little improvement as the result of its introduction. On the other hand, where the schools have been poor, and manual training and its necessary equipment has been added, and where possibly other general improvements have been made in the school, the attendance has probably been materially increased over and above what it otherwise would have been. Just how much this increase in attendance is due to the one factor of manual training is impossible to determine: it is impossible because we can not say with certainty what the situation would have been had it not been introduced. Any one who takes exception to the statement that manual training has increased the attendance can be sure that his statement can not be contradicted with mathematical precision. On the other hand, those who believe that the attendance has been increased can console themselves also with the thought that their contention likewise can not be disproved.



WORK OF SUMMER SCHOOL STUDENTS,
BRADLEY POLYTECHNIC INSTITUTE.

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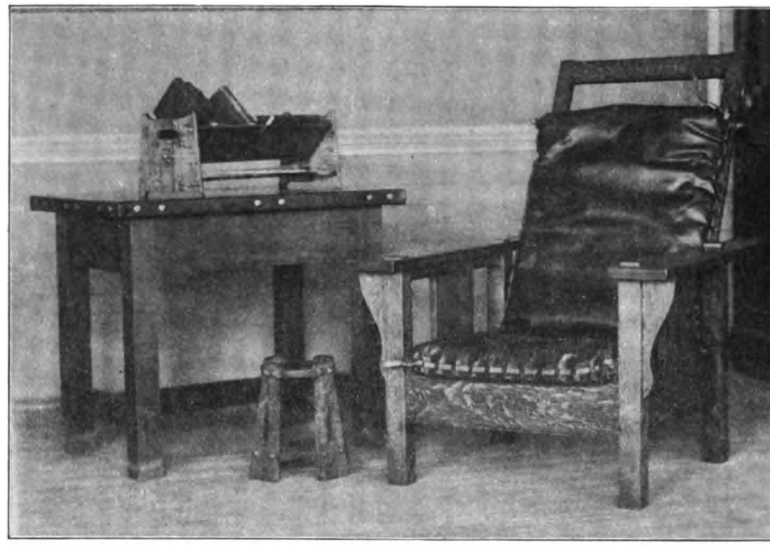

THE ORGANIZATION OF MANUAL TRAINING IN THE HIGH SCHOOL—I

GILBERT B. MORRISON

IN presenting the order of exercises and projects as at present followed in the McKinley High School, I am simply contributing to that almost universal effort which is being made toward the adaptation of our schools to modern demands. I am not offering it as a model to be adopted by other schools, wherein the conditions, ideals and possibilities may be quite different from ours. I am not even offering it as fully representing my own ideal of the best and most appropriate course for the high school of today. It simply represents what we are doing now as the best we have been able to work out in our own environment.

Conditions are not constant; opinion is changing. Our educational horizon is broadening. Certain lines in the perspective are indefinite or missing, and an effort to respond to national demands is becoming general. These demands are social and economic, and spring from an instinctive tendency toward self preservation. This tendency is shown by nations no less than by individuals. A consistent democracy is constant change, as no two successive days finds exactly the same conditions.

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Therefore if there is any one thing that I would urge as necessary it is that we be not in a hurry to legislate on courses of study. The substantial progress made in the reforming of our school curricula during the past few years has its cause in the fact that we have not known just what to do—just how to cope with new demands that press overwhelmingly upon us. As a result, freedom has been accorded to the field men who perhaps more nearly express the common needs of our civilization. This freedom has resulted in a period of experimentation, of comparison, and of intelligent observation. This spirit should be kept alive for some time to come, for we have yet a long distance to come before we shall reach modern requirements in their full measure. The time has not yet come, and probably never will when any one man or set of men can be trusted to formulate a democratic ideal, which can be sterotyped into a perfectly stable system. Contributions to our present needs can be little more than a body of suggestive hints. We must write articles and exchange ideas, but after words have spent their force, the people by a sort of brute instinct for self preservation act in accordance with those elemental principles which can not be set forth in an argument.

We must admit that our progress in the past fifty years has been seriously impeded by assumptions which became crystalized in the academic mind. Certain self-evident truths had been appropriated so persistently as expressing the content of conventional curricula that the habit of thinking of these truths and this content as identical had become fixed. That the making of "men", the building of "character", the preparation for "citizenship" are the objects of education, are axioms which always have, and always will be generally admitted without debate; but the specific means best suited for the attainment of these aims is a different matter.

The school men have after many years of phrasing failed to inspire the laity with a belief in a culture which does not reveal itself in economic efficiency. Forward steps in education have always been taken by those who voice the common sense of the laity. The demand for a practical education which is just now everywhere manifest does not shatter our cherished ideas of American citizenship—a citizenship that is not circumscribed by the accident of birth. It is the development of each boy according to his powers that should engage our attention. In formulating a course of study we have tried to grasp that conception of humanity, which is central and normal, and then gather our activities about it. This central idea is, as I see it, to take each separate indi-

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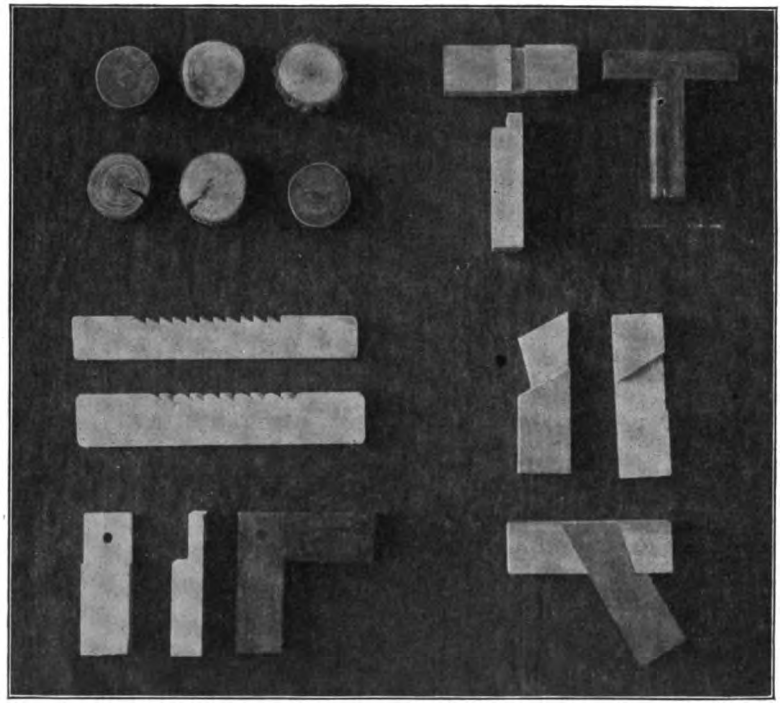
vidual boy or girl as a foundation, and then to build upon him or her according to the nature of that foundation.

I pass now from these general reflections to the organization of the studies and exercises in The McKinley High School. This school, it should be remembered, is one of the district high schools of St. Louis and in common with them contains a cosmopolitan course of study and exercises, comprising nine groups of studies from which



students may choose. The groups, or "courses", are named: Scientific, General, Classical, Art, College Classical, College Scientific, Commercial, Manual Training, and Preparatory to Teacher's College. All of these courses have the following studies in common, though in somewhat different proportions:—English, Algebra, Geometry, Botany, Physiology, Physics, and History.

The advantage we claim in having all of these courses complete in the same school and in the same building are, (1) It enables each child to find in his own school in his own district any study or exercise which

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experience has demonstrated as having a right to exist in a secondary school. (2) It offers each child the free latitude of choice under competent advisors. (3) It offers differentiation without distinction of rank or caste. (4) It permits a change of course without a change of schools when it is discovered that a wrong selection has been made. (5) It places pupils in a position to compare values and to observe the methods and results of different ideals. (6) It enables a pupil to finish his course with his former friends and associates. (7) It enables a pupil to choose special or technical work without crowding him entirely off the conventional highway to learning. (8) It secures in the same school great individual diversity and perfect social unity. It admits differentiation without class estrangement.

From these nine groups at present, more than forty per cent of the pupils entering the McKinley High School choose the Manual Training group, and it is the organization of the work of this course to which I am calling attention in these articles. The following is an outline of the course of study.

MANUAL TRAINING COURSE.

FIRST YEAR.	SECOND YEAR.
English. Manual Training. Drawing.	English. Manual Training. Drawing.
Botany (first half-year). Physiology (second half-year).	Physics.
Algebra.	Geometry
THIRD YEAR.	**FOURTH YEAR.**
English. Manual Training. Drawing. One of the following languages: Latin, German, French, Spanish. Physics (first half year), and Chemistry (second half-year), or Algebra and Geometry. History.	English and Shakespeare. Manual Training. Drawing. One of the following languages: Latin, German, French, Spanish. Chemistry or Trigonometry. History.

In the academic studies the individuality of the pupil is appealed to throughout, and promotion is made by subjects. The course provides the mechanic arts for boys and the domestic arts for girls. But it is the mechanic arts to which I shall now direct attention. In the elementary schools of St. Louis manual training is provided once a week through the seventh and eighth grades, so that the pupils come with some

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knowledge and skill in the use of certain tools. After preliminary instruction in the further use of tools, and the general study of woods the first work is the selection of an exercise which will give skill and practice on some simple process in joinery. Before doing this, however, the teacher calls the pupils attention to several applications of this process impressing upon him the necessity of some knowledge of it before he can hope for much success in making things in which it must be employed. The boy learns that the mortise and tenon has a broad application in the manufacture of such articles as sash, doors, furniture, framing, bridge work, etc. In the selection of the exercise or article to be made illustrating the process, the individuality of the pupil is consulted. He may for example, make a simple mortise or tenon joint, a table leg, or four table legs assembled in a table frame, according to his advancement, ability and speed. No attempt is made to make all boys do the same amount of work, for this would be like trying to make two pendulums of different lengths beat at the same rate.

So soon as a boy shows sufficient skill in the use of his tools he is encouraged to make some useful article such as a table, a chair, or a stand. We do not find the boy who gets no further in this exercise lesson than the making of the simple joint becomes discouraged. If he makes a joint by the correct use of his tools, which receives the teacher's approval, he feels that he has shown his ability to at least make a part of a table as a mechanic would do it. He has proved to that extent his economic efficiency. He has shown that he can work along correct lines. We allow the boys some choice within technical limits in the selection of their exercises, but we never leave them fancy free to potter along in their own way. We are not afraid of dwarfing their initiative powers when we hold our boys down to systematic progressive work. We avoid that so-called "constructive" work which expects a boy to find his own technique while expressing "The Self" in ill chosen "creations."

Normal motives appeal to normal boys. The average boy wants an education; he wants to become a useful man; he wants the pleasure which comes from a sense of power to do things as men do them; he is willing to work for this power and for the skill which brings it. We do not forget the importance of learning to think, but the importance of learning to work is paramount. The joy of systematic, skillful, successful work when it is well timed is as great as the joy of play. There is an occasional boy who will not readily respond to normal motives—the

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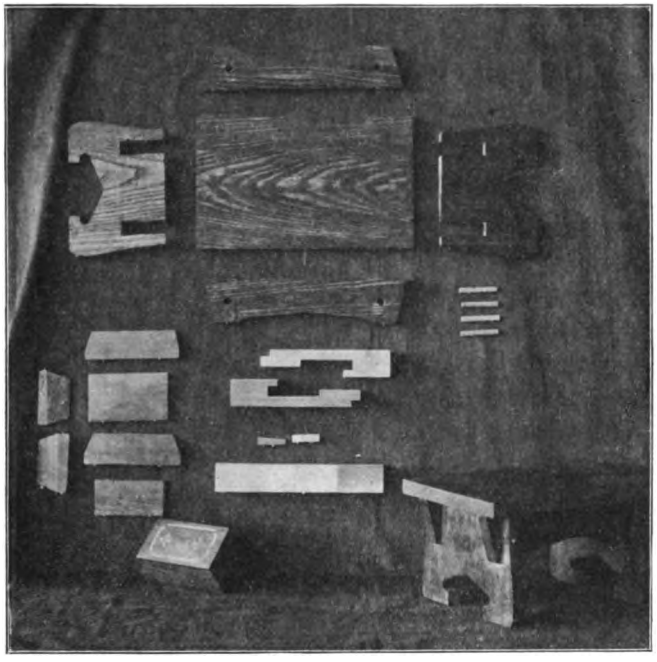
lazy, spoiled boy whose ambition is measured by the selfish gratification he experiences from moment to moment in his amusements. For him we may sometimes be justified in resorting to molycoddling methods. We may allow him to "make something" which suits his fancy in the hope that he may be led to see for himself the importance of systematic work.



In connection with the shopwork, we have a course of designing which we apply after the boys have finished the first quarter's work. This we hold to be of first importance. By referring to the accompanying tables the scheme of our work for the first year may be obtained. It will be observed that we give attention, (1)to the processes of joinery; (2) to the applications of joinery; (3) to the exercises, articles or projects illustrating the processes; and (4) to the form of design which is applicable to these processes and exercises. We aim at correct technique, utility, good workmanship, and artistic execution. We carefully avoid those practices which would not command the respect of practical, intelligent mechanics. Of the great importance of such a measure of our high school manual training I shall speak at a future time when I turn

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TABLE I.—JOINERY.—First Year.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
1st	1. Care of Tools	General		
	2. Study of Woods	General		
	3. Gaining	Shelving, Pigeon Holing. Furniture	Half Joint Brace Joint Lap Joint Dado Joint	
	4. Mortising	Sash, Doors, Furniture, Framing, Bridge Work	Mortise and Tenon Joint, Table Leg, Mortise and Tenon with relish	
2d	5. Forming	Trays, Lamps, Book Racks, Furniture	Pin Tray, Pen Tray, Whisk Holder Paper Knife, Moulding, Book Rack	Inlaying or Carving
	Finishing 6. Staining Varnishing	All Interior Woodwork and Furniture	All Exercises except the Joints	
	7. Splicing	Building Construction and Framing	Various Splice Joints	
	8. Mitering and Gluing	Interior Finish, Mouldings, Picture Frames, Pattern Making	Miter Box, Jewel Case, Picture Frame, Triangle, Beveled Tray	Inlaying
3d	9. Tongue and Grooving	Flooring, Box Making, Slides, Furniture	Book Rack, Stand, Lamp	Low Relief Carving
	10. Angle Joining	Pattern Making, Furniture	Clock Case, Tabourette, Lamp Stand	High Relief Carving
	11. Splining	Round Corner Joints, Light Cabinet Making	Glove Box, Handkerchief Box, Jewel Case	Inlaying
4th	12. Dovetailing	Drawers, Framing, Boxes, Braces	Dovetail Joint, Revolv. Book-Rack, Chest, False Dovetail	Chest Banded with Copper, Inlaying, Carving
	13. Irregular Shaping	Pattern Making, Cabinet Making	Paper Weight, Pin Tray, Pen Tray, Ink Stand	Carving, Line and Surface Relief
	14. Cabinet Making	Furniture, Interior Woodwork and Finish	Magazine Holder, Tabourette, "T" Square, Screens, Writing Board, Electrolier	Any acceptable Method of Decoration

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TABLE II.—DRAWING.—First Year.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
1st	1. (a) Lettering	General	2 small sheets of Freehand and Instrumental Lettering	
	(b) Design (Fri.)	Surface Decor.	Elements of Design	
	2. (a) Ruling Pen Practice	General	1 small sheet	
	(b) Design	Surface Decor.	Elements of Design	Spotting
	3. (a) Orthographic Projections 3rd Qdr.	Working Drawings	7 Drawings of Geometrical Blocks and Shop Exercises	
	(b) Design	Surface Decor.	Surface Decor. of Shop Exercises	Composition
2d	4. (a) Working Drawings	Shop Practice	2 Large Sheets of Table Machine Parts	
	(b) Design	Surface Decor.	Decoration of Book Rack, etc.	St. Line
	5. (a) Isometric Projection and Rendering	Picture and Constructive Purposes	1 Large Sheet of Geometrical Forms	
	(b) Design	Decoration of Joinery Exercises	Inlaying and Carving Decoration of Glove Box, etc.	Curved Line
3d	6. (a) Cabinet Projection and Rendering	Picture and Constructive Purposes	1 Large Sheet of Geometrical Forms, 1 Large Sheet of Drawing desk rendered	
	(b) Design	Form and Surface Decoration	Designs for Low and High Relief Carving	
4th	7. (a) Freehand Drawing from Machines (Pencil)	Preliminary to making of Working Drawings and Pictures	Steam Pump, Machine Tools, etc.	
	(b) Design	Form and Decoration of Cabinet work	Designs of Lamp Shades, etc., with Copper Banding	Form and Decorative
	8. (a) Freehand Drawing from Casts (Charcoal)	Architectural Drawing	Casts of Human Anatomy and other objects.	
	(b) Design	Form and Decoration of Cabinet work	Design of Pen Tray, etc. (cont.)	Form and Decorative

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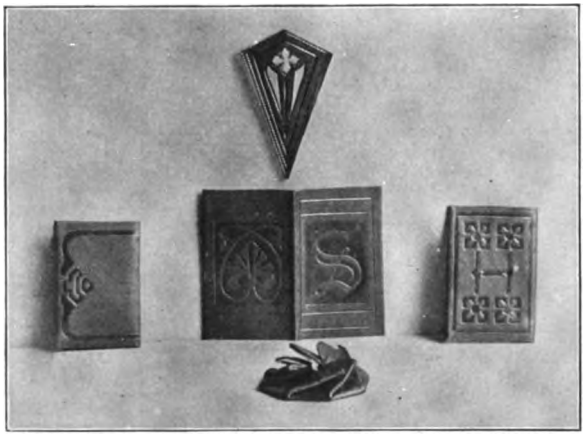
to the problem of industrial education. Whatever we have been able to accomplish is due largely to an enlightened supervision which within reasonable limitations enables us to work in an unrestricted atmosphere.

Our work as outlined in these tables, and in others which will follow are subject to modification and change. These outlines show what we did during the past year. Credit for the arrangement of Table I is due to Stanley H. Moore, Roy C. Woolman and E. F. Card of the McKinley High School, and R. A. Kissack of the Yeatman High School; and table II to A. J. Burr and Edward Frauenfelder of the McKinley High School, and M. J. Scherer of the Yeatman.

The next article which will tabulate the work of our second year, will contain a short discussion of the *Aims* as distinguished from the *Aim* of manual training.



LEATHER TOOLING BY STUDENTS IN APPLIED DESIGN, BRADLEY POLYTECHNIC INSTITUTE.

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EMBROIDERY.—I

GERTRUDE ROBERTS SMITH

IN the present revival of the crafts, and the high ideals aspired to in their various activities, it is earnestly hoped embroidery will maintain the dignified position it has occupied in the past.

On the fruits of healthy happy work we have much daily literature, and our hope for a large part of the mental and moral vitality of education in the future, seems to rest upon the concentration of all our powers toward the forgetfulness of aught, save how to do something well. In recognizing the physical demand for beauty in the happiness coming from work, we find justification for great expenditure of time and money in the development of new fields of expression and almost personal appeals for special subjects. With the truth that the more varied our interests the greater our pleasures, we must remember, the door to all nature's treasures is not opened with the same key, hence our effort to appreciate with intelligence and toleration the work of others.

It is not claimed anything new is contributed through this article, to the art-craft of the needle. Rather, a renaissance is desired for it in the clearer atmosphere of fine design thought, which is coming to us from the inspiration of such lovers of the beautiful as Mr. Arthur W. Dow and Dr. Denman Ross. Surely, no one craft can combine more sympathetically, or in more varied way, perfection of textures in space and color harmony, than cloth and stitches which can be controlled by the needle worker. The possibilities for thoughtful adjustment of color is limitless in a scale of embroidery silk. The colors are not unlike pastels and should the artist of the needles so desire the effect of broken color can be produced as surely as from the palette of the painter.

In our age needlework has probably shared with china painting greater degradation than any of the crafts. Under the name of Art and Royalty it has been tortured into every conceivable technique which could be invented to further the interests of commercial gain. Our feverish desire for novelty has been fostered by grafting new names on old products, or what is more misleading, old names on an unintelligent rearrangement of originally good material. There is much to be longed for in the so-called revival of colonial embroidery; while all the laws of design have been violated at one time or another under the name of Mount Mellic. Whatever the first ideals of Kensington embroidery

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may have been, we are now most conscious of the evils it has left with us.

The return to honest principles, and special commendation of robust materials, as hand-woven linens, etc., which William Morris stood for in embroidery, did more than any one movement in modern times, to save the art, from those extravagances under which it had been buried, utterly dead to our cravings for good taste.

So far removed are modern embroideries from the beautiful examples of the past, shown in our museums, that the average visitor gazes at them through their glass coverings, as curiously as at the mummy wrappings of ancient Egypt, and with as little thought of any lesson from them touching our own time. To any one who has enjoyed fashioning in the real, some image which his own imagination has created, these old embroideries are fraught with a richness and sincerity of purpose most convincing. At the same time, the adjustment of design and technique to materials, responds truly to all we know of aesthetics. From the simplest to the most ornate, where the design is good, either because of space or color interest, or both, we find pleasure. That there must have been pleasure in its making seems evident, since the design suggestions usually reflect the every-day life of the period and place in which they were produced.

There is a special charm in the individuality marking the primitive embroideries, which the larger and more gorgeous examples of a later period rarely possess. Their simplicity makes the processes by means of which a result is arrived at easier to analyze. They seem to have a message for us. I am convinced, it is through familiarity with them and the knowledge coming to us from study of design, that our new school of embroidery is to be built up, rather than through the societies of decorative art as they now exist.

That embroidery is still considered abstractly an art, is shown by its admittance to the various exhibitions of arts and crafts. But that at present the best thought of our design training has not been put into it, is evidenced by the meagerness of the exhibits and the poverty of imagination as well as beauty, generally shown in them. The fact that the machinery of the needle is so directly controlled by the worker should place the design ideal higher. Not but that there are technical limitations imposed by thread and cloth. In the very ductility of their nature lies one of the dangers of too great realism in design; and again, the stitchery seems, in the opportunity it offers for invention, to blind the worker to the more important matter of effect as a whole.

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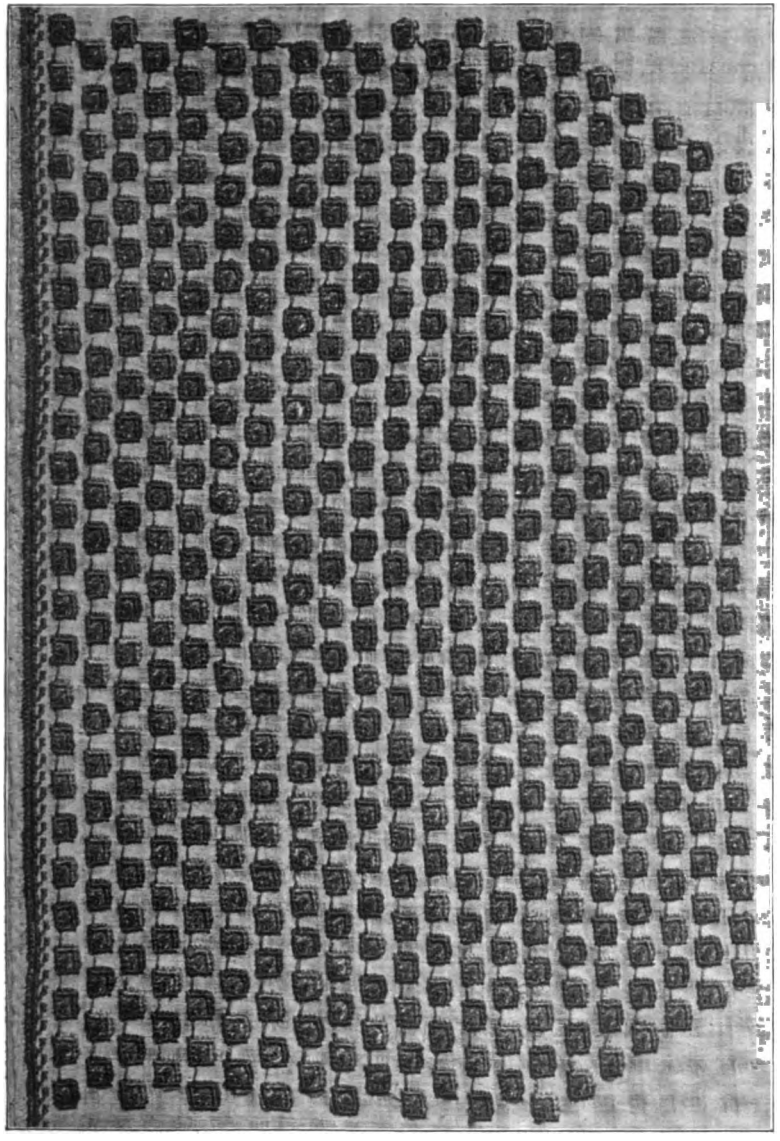

FIG. 1.—TURKISH EMBROIDERED LEGGIN. REDUCED ABOUT ONE-HALF. COLOR—RED, BLUE AND GREEN.

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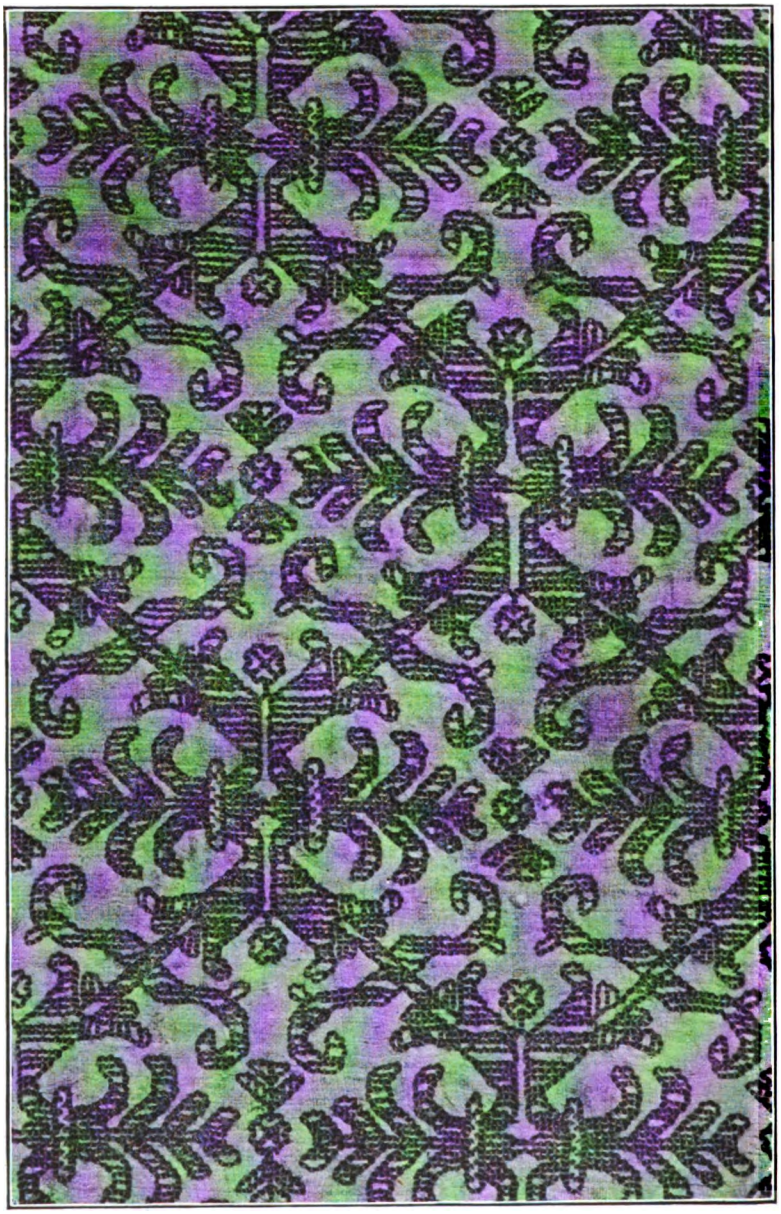

FIG. 2—LATE XVI CENTURY EMBROIDERY. EFFECT PRODUCED BY THE SIMPLEST OUTLINE STITCH. ORIGINAL COLOR— DEEP ROSE OR CRIMSON.

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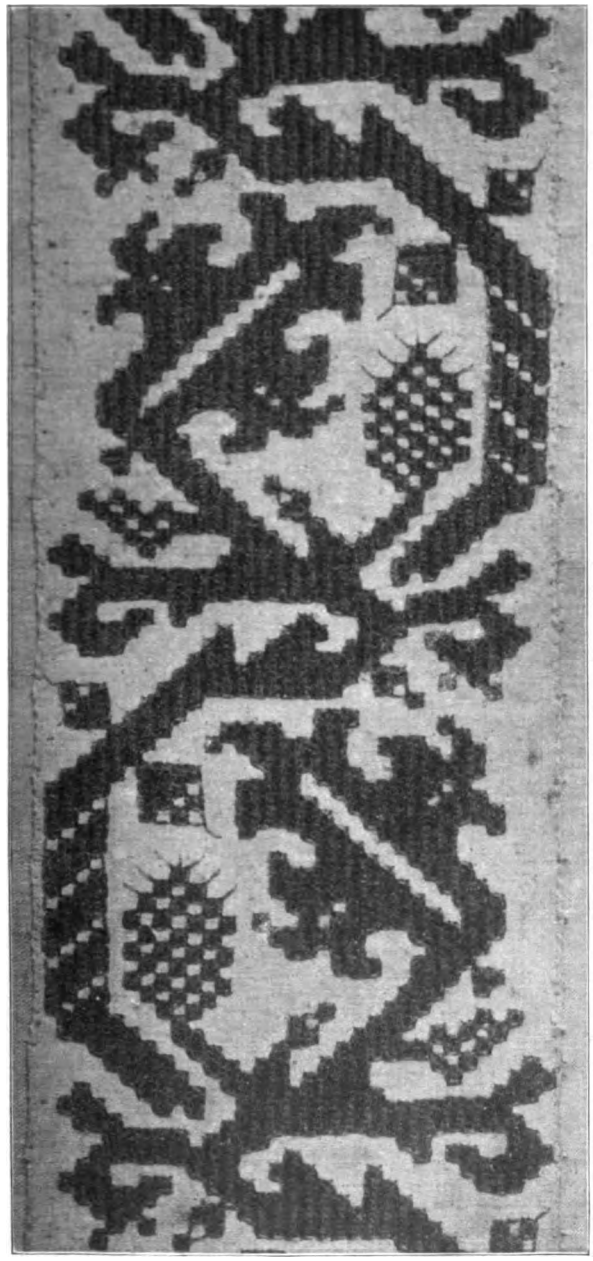

FIG. 3—EMBROIDERED BAND. COLOR OF ORIGINAL—GOLD OUTLINED WITH DEEP BLUE.

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In the execution of those examples of the older needlework which give us most lasting pleasure, more than one kind of stitch has rarely been used, and it has been my experience in actual practice, that satisfaction is with difficulty achieved where more than two are combined in the same design. This refers to work in colors; work in white, or one color value, offers a somewhat different problem. It seems worth while to consider seriously, this question of stitches, for it has been a prevalent error in the minds of many who love to do needle work, that stitchery constitutes embroidery, and having lessons in the latter means being taught to use the needle in some new and mysterious way.

Real lovers of beauty in embroidery, are constantly irritated by questions relating to its execution, the real purpose of its creation being missed altogether. How this condition has come about we shall not now enquire. But the fallacy of it is manifest in the work we know and recognize as superior to our own. The truth is, that in needlework as in any other craft, a knowledge of its tools, is but to strengthen its art. From long familiarity with their usage, comes to the needleworker, courage and power to do the unusual and make it convincing.

Good embroidery always regards the woven threads of the background. Presuming it is cloth we are considering, to it our embroidery should bring, not only a clear expression of some design thought, but preserve a pleasurable harmony in textures. The latter is well illustrated by the cross stitch embroideries so familiar to most of us. The designs are often far from good but the construction of the stitches, accenting as they do the angles formed by warp and woof, constitute in themselves great charm. When worked on coarse material the thread weavings assert themselves in the design spacings, and our satisfaction is given additional gratification. (Fig. 1.) It is regretted the example shown in the embroidered leggin,[1] cannot here convey the exquisite beauty of color arrangement. In it we have clear strong blue and red alternated in the regular repeat of an equally intense green. The spaces are perfectly controlled, and when the simplicity of the means is considered the result is amazing. In its way art can go no farther.

In Fig. 2, we have great richness obtained, by the simplest possible outline stitch. Color even has not been called upon to add its interest, and the soft crimson of the design depends only upon the direction of

[1]The illustrations accompanying this article were made from examples of embroidery in the Boston Museum of Fine Arts.

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FIG. 4—TURKISH EMBROIDERED SCARF. GREATLY REDUCED. COLOR MOST BEAUTIFUL—TWO VIOLET PURPLES, TWO YELLOWS.

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stitches for variety. The massing of lines in the pattern gives tone quality at intervals, where the eye may pause with pleasure. The larger spaces of the design are ingeniously opposed to those left in the background, and a reasonable construction with quiet movement preserved in the more slender parts of the design.

The third illustration shows design beautifully adapted to border space. The colors are gold, edged with deep blue.

The fourth illustration is a fine adjustment of color; the texture here is especially soft and smooth. Two values from the purple scale are balanced with two from the yellow, one of each being modified in intensity. The whole design is outlined with soft black.

In these illustrations we have designs perfectly suited to the material. It could not be said of any one of them, "This would be better expressed in another medium." Note that those curves whose beauty would be disturbed by cloth wrinkling have been avoided. This may be counted an essential in embroidery. In good designs where curved forms do exist, they are generally kept in harmony with the cloth weave by a suggestion of angles in the outline.

Where the background is of finely woven material, either linen or silk, the design may be smaller and preserve greater delicacy in drawing. Again the distance at which it is to be seen and the purpose for which it is to be used should influence its manner and selection of material.

The early handicrafts of our country have always had interest for me. In them we feel adjustment of desire for beauty, with dignified restraint. Our grandmothers found and prepared the materials from which they spun threads and wove cloth. They made their own dyes and often used them in realizing some design which their fancy had conceived. In the compromise often enforced by natural conditions, little wonder we have developed in these creations power as well as the vitality, without which no object fashioned by the human hand can have lasting interest or value. These works are in a class by themselves, almost exempt from criticism.

In the freedom from self-consciousness fostered by outside conventions, these early workers were more fortunate than we. With them the thought was primarily of the thing being fashioned, and as it was made at some physical sacrifice, the demands of service and durability were properly considered, and the best possible material and work put into it. It is to be regretted the old idea of "its being worth while" has given place to the modern thought, "It's entirely too much work."

If embroidery is again to become a living art, it must be from real love of creating beauty in it, all thought of the quantity to be produced or the time it involves being forgotten in the higher ideal of quality.

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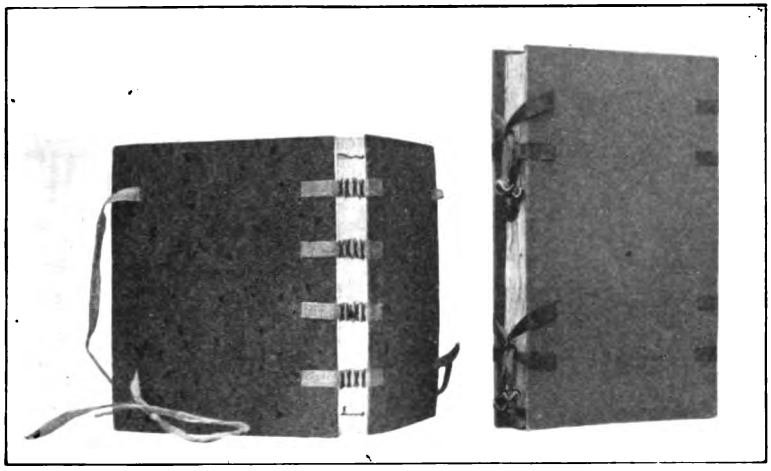

SOME DECORATIVE BOOKS

GERTRUDE STILES

THE type of book here illustrated brings into use certain processes of forwarding which are done in the same manner as in any more advanced example of library binding. A library binding of half leather, if bound from the sheets will have in order the following steps: folding, cutting, forming into sections, sewing, cutting of boards, rounding, backing, lacing in, covering, pasting down end sheets. In this book, we begin with the folding and cutting, form into sections, and then sew as for a library binding on tapes. We stop when the book is at this stage, impressed by the decorative possibilities in the sewing—the straight lines of tape pleasantly spaced across the back and the management of the threads, caught up at intervals, form a design in bright color against the dull background of the tapes,—all this seems too interesting to be lost. Some such mental process has led to this very decorative type, the structural condition already existing, constituting its artistic claim.

These books were made with success by pupils in the sixth, seventh and eighth grades in the bookbinding class in the School of Education, Chicago. They were used as visitors or guest books,—blank books, of

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course, made from good quality heavy grade book paper, or M. B. M. charcoal paper. They were sewed upon tapes, ribbons, or leather cut into strips 5/8-in. wide. Bright silk twist was used in the sewing, in color contrasting or harmonizing with the colors of the materials used. The covers were of linen, Japanese grass cloth or of different cover papers. Sometimes, if covered in plain cloth or paper, a further decoration was added, of stencil or lettering. The colors and materials were at the selection of the pupils and many tastes were displayed. One child designed the book for the guest chamber in his home and used as covering a bit of the cretonne used in the room furnishings, with ribbons and silk to harmonize.

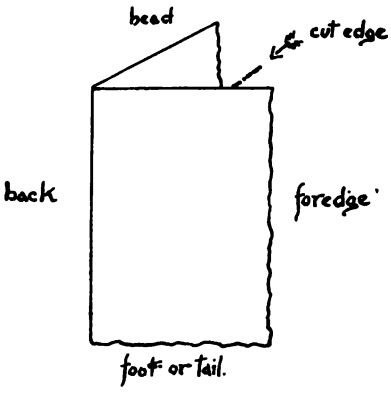

FIG. 1.

After yielding to this decoration produced by the sewing process we leave the narrow path of the more orthodox library binding, omit the rounding and backing entirely; we cover and finish our boards as fancifully as we choose; we say good-bye to precedent and follow our fancy.

In the folding and sewing, however, tradition and precedent must rule.

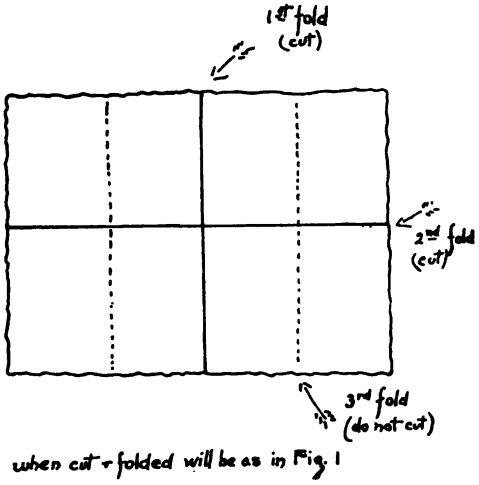

FIG. 2.

FOLDING.

If a hand-made paper is used, preserve the deckle edge, allowing it to come at the foredge and foot of the book, and the cut edge at the top. (Fig. 1.) All charcoal papers measures 19 x 25-in. This folded four times will divide the sheets thus:—19 x 25, 19 x 12½, 9½ x 12½, 9½ x 6¼. A dozen

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sheets of charcoal paper makes a fair sized book: one sheet will form a section of four folded sheets, or eight leaves, or 16 pages. (Fig. 2.) We are dealing with blank sheets. If the sheets were printed, they would fold in the same manner, and at the foot of the first page of each group of sheets which form the section would be a number or a letter indicating the order in which the sheets should be folded and placed, that they may be read consecutively. These numbers or letters are called "signatures". The printer also applies the term "signatures" to the entire group of sheets, forming what the bookbinders call "sections".

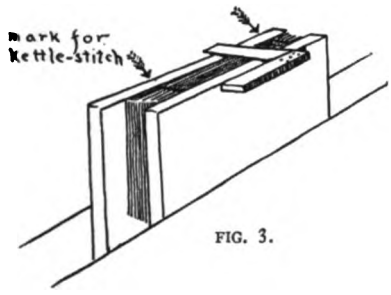

FIG. 3.

If this were a printed book we would not alter the sections or the number of sheets forming a section but with the blank book we may do as we like. We have twelve sections, four sheets each, but let us make sixteen sections of three sheets each, being careful as we divide that we keep the cut edges at the head

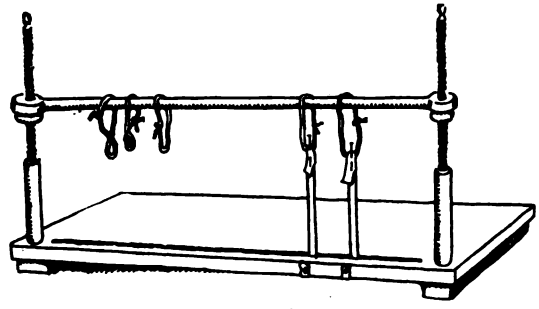

FIG. 4.

and the deckle on the foredge and foot. A hand-made paper is never perfectly square, but by keeping the cut edges which should be straight, at the head, you will have always a right angle formed by the cut edge of the head and the folded edge of the back.

MARKING UP.

Place the folded sections together, forming now a book, and put between waste boards, old book covers, or two small pressing boards;

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knock all the sections up squarely at the back and head, and place in the cutting press. It is important the head should be at right angles with the sides; test with a square. Mark a straight line ⅜ of an inch from the head and from the foot, do this with square, and saw slight cuts in the folded backs on these two lines. These lines are the marks for the kettle-stitches, and the knot formed there by the thread will sink into these openings. (Fig. 3.)

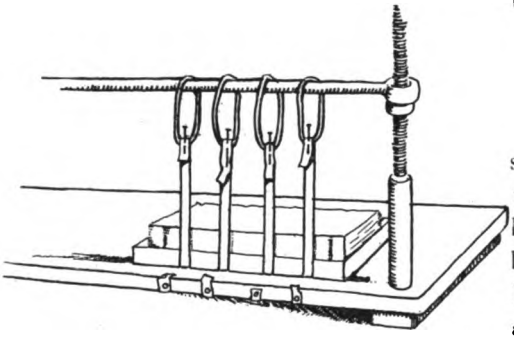

FIG. 5.

SETTING UP SEWING FRAME.

The sewing frame should be set up with four tapes. These tapes can be tied to the horizontal bar of the sewing frame, but better still to have always on the frame several "lay cords", heavy cords looped over the bar, tied securely and hanging 4 or 5 inches below. This loop offers a good, strong hold and the tapes can be pinned or tied to this, with the further advantage of economizing in tape. Fasten the four tapes to the lay cords (Fig. 4.) Sit in front of the frame with screws toward you. Place your book on the bed of sewing frame with the back of the book against the slit in the bed of the frame and the head to the right. Dispose your tapes across the back of the book so that they are evenly spaced, or spaced according to a design previously planned; draw the tapes down through the slit in the bed of the frame and fasten with thumb tack. Push your board and book close against the tapes; screw up the rings of the frame to tighten the tapes; look a second time at your spacing to see that the tightening has not altered these relations, and you are ready to sew. Mark a pencil line straight up the tapes on the back of the book. (Fig. 5.)

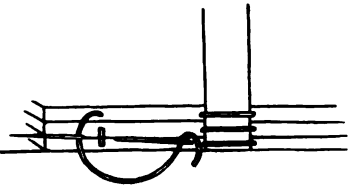

FIG. 6.

The tapes should be equally tight and it is better to place the book and tapes toward the right end of the horizontal bar. This allows the arm to pass between the left hand upright of the press and the tapes, a position convenient for working.

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SEWING.

Now place the book face upwards near at hand and take up with left hand the first section; open it carefully to the middle of section and slip the forefinger inside to keep the place; be sure that the head is even, that is all three of the sheets comprising the section are level at the head and none of them slipped down. Place it flat on the pressing board, the back against the tapes according to pencil marks, and the head to the right. With the right hand insert the threaded needle in the

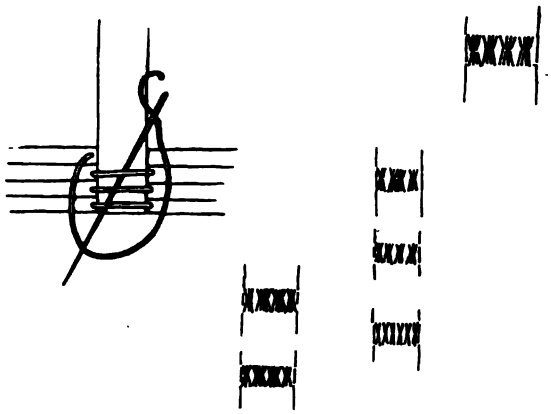

FIG. 7.

saw-cut made near the head of the fold; pass it through this into the inside of the section, where the left hand takes it and thrusts it back, passing it out against the right hand side of the first tape; here the right hand again takes the needle and crossing the tape passes it back at the left hand side of the tape. The thread crosses the four tapes in the same way and comes out at last at the kettle-stitch saw-cut at the foot of the section. Pick up next section and place in position; thrust the needle through the foot kettle-stitch cut, and sew as with the first section, only passing from foot to head in place of from head to foot. When the thread comes out at head kettle-stitch, tie it firmly to the loose end of thread which is still hanging there. Tie in hard knot and allow the knot to sink back into the saw-cut. The third section is then taken up and sewed as was the first from head to foot. When reaching the foot, and emerging from the inside of section, the thread should fasten to the first two sections to hold the three securely at this point. To do

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this, pass the needle between first and second sections behind the thread which has previously joined them, but before drawing it tight, pass the needle through the loop thus made by the thread, and a tight knot is the result, called unaccountably a "kettle-stitch." (Fig. 6.)

The fourth section is then placed in position and started in the same way as the three previous, but instead of crossing the tapes directly, the needle passes under the group of threads previously crossed on the tape, catches up these three threads into a knot like the kettle-stitch and then passes on into the section in regular order. This serves primarily to tighten the sewing, and in the second place is made decorative. In the book of sixteen sections the thread of every fourth section can be used to catch up. A variety can be made by different groupings. (Fig. 7.) When necessary to join the thread, be careful that the knot does not occur on the outside of the section. A weaver's knot is best, cut the ends ½ in. long and fray out. In sewing learn to keep the left hand inside the section and allow it to do the work there; and the right hand to do all the work on the outside. The left hand can also assist in holding the sheets firm. By bearing down heavily with the side of the hand and the little finger the section can be held in place and still allow the other three fingers and thumb to manipulate the needle. This is important, difficult at first, but when once learned, better and quicker sewing is the result. The disadvantage of sending the right hand around the frame and into the book, to inquire into the doings of the left, are obvious.

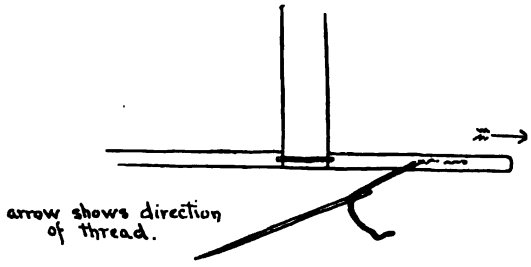

FIG. 8.

FIG. 9.

After the catch-up stitch no other complications arise, and each section is sewed in its order. At the end make two kettle-stitches for greater security. Be careful not to forget the kettle-stitches. Always make one as the thread finishes at each section. Draw the thread tight, and always, when pulling it to tighten, pull in the direction the thread is going, or a badly torn section will be the result. (Fig. 8.) Do not

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draw kettle-stitches too tight, or your book will bulge through the middle. (Fig. 9.) When finished the book should have the sections showing level at the head, the tapes rightly spaced and going straight across the back, not wrinkled or crooked and the stitches crossing them evenly. Loosen the screws of sewing frame. Take out thumb tacks and pins and your book is sewed.

CUTTING THE BOARDS.

Boards should be a good quality of binder's board, between 1-16 and 1-18 in. in thickness. These should be cut to extend ⅛ in. beyond the size of the book to form what is called the "squares" of the book, and is for protection to the leaves. Allow this projection to be on the three sides only,—the head foredge and foot. If our book is 6¼ x 9½ then boards should be 6⅜ x 9¾.

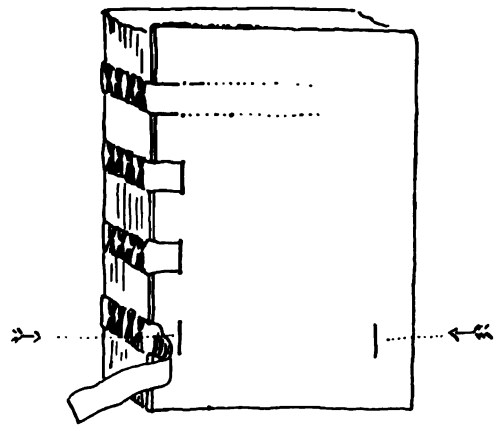

FIG. 10.

COVERING.

If our cover material is cloth, it is better to leave the body of the cloth unpasted, and paste only those portions which turn over the edge; with some ordinary white paper, and use this side against the cloth. Allow ¾-in. for turning in of the cover material. Use paste, not glue pull it over smoothly without stretching. Better to paste the two long sides first, then ends; in case the cloth does stretch, this will help it to stretch evenly. When covering with cloth, the corners work better if the sharp right-angle of the board is cut down just enough to take off the sharpness of the angle.

LACING IN

Place the boards in position on the book, the squares adjusted, and the boards flush with the back. Draw the tapes out on top of the

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boards, straight across at right angles to the back, and ¾-in. from the back, mark two points indicating the width of the tapes. (Fig. 10.) One board can be marked by the other, being careful that you do not mark them both for one side. Take your knife and cut a slit in the board for the tape; make the cut slanting away from the back. Draw the tapes through snugly, so that when the board is closed there is no slack in the tape. Paste down end of tape on inside of board; with a hammer beat the board where the slit was made, and it will close, holding the tape firmly. Put in ties for the front in the same way. If tapes are

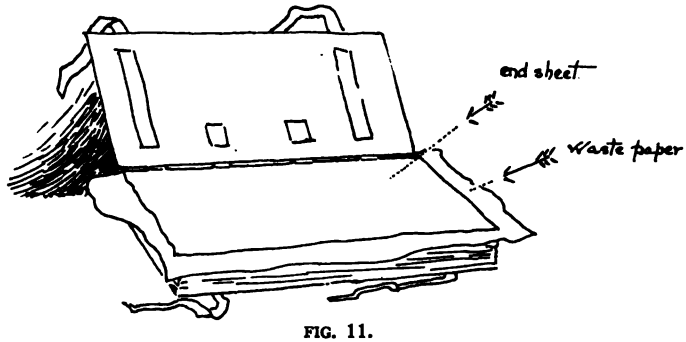

FIG. 11.

made long enough bring them through to form ties. This carries out the implied construction of the tapes going all around the book, but is not necessary.

PASTING DOWN ENDS.

Throw back the board cover, slip a waste piece of paper which is larger than the book sheet under the first page; (Fig. 11.) paste all over the front of the first page, slip out the waste paper, and close the cover on the pasted sheet; press down with the hands. Paste end sheet at other end of book in same way. Then inside each cover, slip in a pressing tin covered with clean paper, and press for a moment under quick hard pressure. Take out and substitute blotting papers in place of the tins; place in press again, but not hard pressure, and allow to dry.

The final purpose of these books is a varied one. Beside their use as visitors books, they are excellent as a register for a club or society, for banquet gatherings, for a child's annals or even to hold an artist's records of certain pictures, when and where painted, where sold etc. The decoration can be nothing beyond that of tapes and sewing or it can be as elaborate as one wishes, materials and color adding all richness of effect that may be desired.

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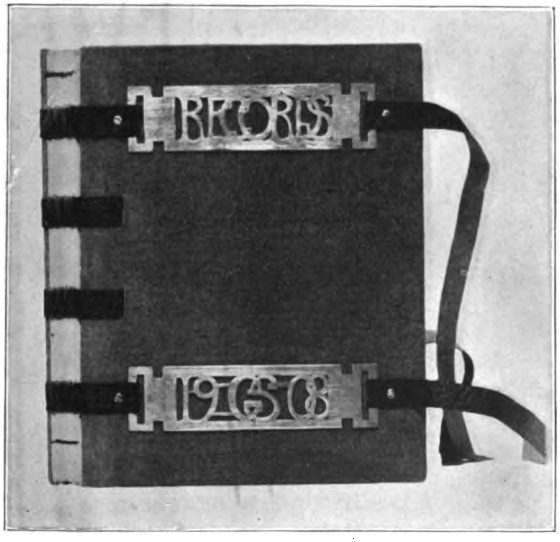
In the photograph below, the cover material is dull linen of a natural color, the leather is an olive green Levant, the silk a duller green, and the metal of dull brass. Copper lends itself to most delightful decoration,—be careful to use a thin sheet metal or it will appear clumsy. Metal fastenings could be made, always remembering that they should not be too heavy for the character of the general construction. The book without backing and rounding is of a more or less transient nature, and while it will endure the wear it is liable to have will not endure artistically a decoration more suited to a solidly backed book. In the photograph on page 41, the larger book was sewed on linen tape, colored a dull salmon tint; the silk used was golden brown, the cover a biscuit colored cover paper, and the fastening a loop of tape, through which is thrust tape ends finished off with dull venetian beads. These books are all made of charcoal paper; one is the exact size of the folded sheet, the other two cut down 1½ or 2 inches at the head, giving a little variety in shape. The third book, page 41, is sewed with green silk on natural colored linen tape and the cover paper a Kuro Nkaboban from Japan.



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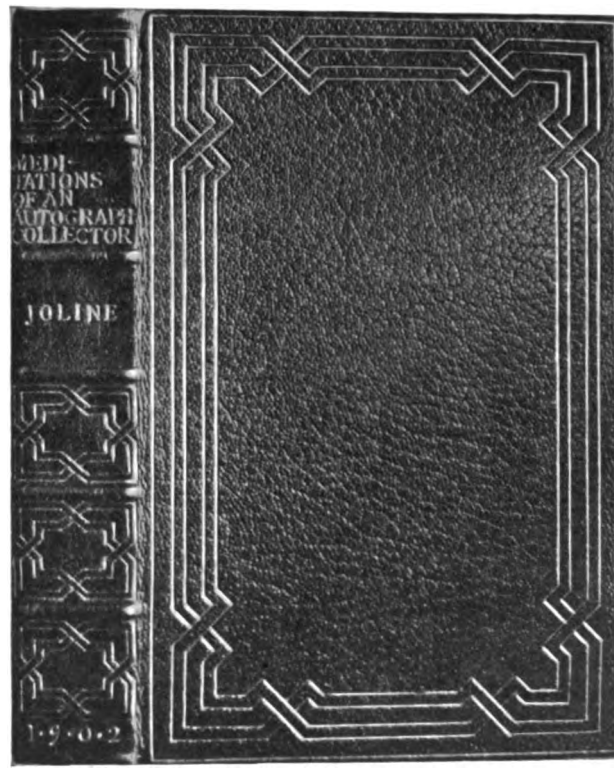

DESIGNED AND EXECUTED BY STUDENTS IN TRENTON SCHOOL OF INDUSTRIAL ART.

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THE COMMON JOINTS[1]

WILLIAM NOYES

THE making of joints as joints less and less constitutes the curriculum of manual training courses, but since joinery involves the constant use of joints, a reference list of them, with illustrations, definitions and uses will be of convenience to workers in wood.

The various kinds of joints may be classified according to the direction in which the joined pieces meet, as; I, End to end, II, At right angles, III, At oblique angles, IV, Edge to edge.

I. END TO END.

1. A lapped and strapped joint is made by laying one end of a timber over another and fastening them together with bent straps on the ends of which are screws by which they may be tightened. It is very strong joint and is used where the beams need lengthening as in false work or in long ladders and flag poles.

2. A butted and doweled joint is made by inserting one or more dowel pins in the ends of the two pieces butting together. It is used in joinery where there is little transverse strain.

3. A fished joint is made by butting the squared ends of two timbers together and placing short pieces of wood or iron, called fish plates, over the faces of the timbers and bolting or spiking the whole firmly together. It is used for joining timbers in the direction of their length, as in boat construction.

4. In a fished joint keys are often inserted between the fish plate and beam at right angles to the bolts in order to lessen the strain that comes upon the bolts when the joint is subjected to tension. In wide pieces and for extra strength as in bridge work the bolts may be staggered.

5, 6, 7 and 8. A scarf or spliced joint is made by joining together with flush surfaces the ends of two timbers in such a way as to enable them to resist compression, as in 5, tension, as in 6, both, as in 7 where the scarf is tabled, or cross strain as in 8. No. 5 is used in house sills and in splicing out short posts, Nos. 6 and 7 in open frame work. A

1. Corrections will be gladly received by the writer.
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joint to resist cross strain is stronger when scarfed vertically (Fig. 8 is a plan) through its depth than flat-wise across its width.

II. JOINTS AT RIGHT ANGLES.

9. A doweled butt joint is made by inserting, with glue, dowel pins into holes bored into the two pieces to be joined. It is used in cabinet making, as in joining the edges of two boards at right angles where the presence of nails would be unseemly.

10. A toe-nailed joint is made by driving nails diagonally through corners of one piece into another. It is used in fastening the studding to the sill in balloon framing.

11. A draw-bolt joint is made by inserting an iron bolt through a hole in one piece and into another to meet a nut inserted from the side. It is very strong and is used in bench construction, wooden machinery, etc.

12. A plain butt joint is one in which the pieces join endwise or edgewise without overlapping. It is used on returns as in ordinary boxes and cases.

13. A glued and blocked joint is made by gluing and rubbing a block in the inside corner of two pieces which are butted and glued together. It is used in stair work and cabinet work as in the corners of bureaus.

14. A hopper joint is a butt joint, but is peculiar in that the edges are not right angles on account of the pitch of the sides. It is used in hoppers, bins, chutes, etc.

A halved joint is one in which half the thickness of each piece is notched out and the remaining portion of one just fits into the notch in the other, so that the upper and under surfaces of the pieces are flush.

15. A cross-lap joint is a halved joint in which both pieces project both ways from the joint. A very common joint used in both carpentery and joinery as where stretchers cross each other in the same plane.

16. A middle-lap joint is made in the same way as a cross-lap joint, but one piece projects from the joint in only one direction. It is used to join stretchers to rails as in floor timbers.

17. An end-lap joint is made in the same way as a cross-lap joint except that the joint is at the end of both pieces. It is used at the corners of sills and plates, also sometimes in chair-seats.

18. A dovetail halving or lap-dovetail is a middle-lap joint with the pin made dovetail in shape, and thus better able to resist tension. It is used for strong tee joints.

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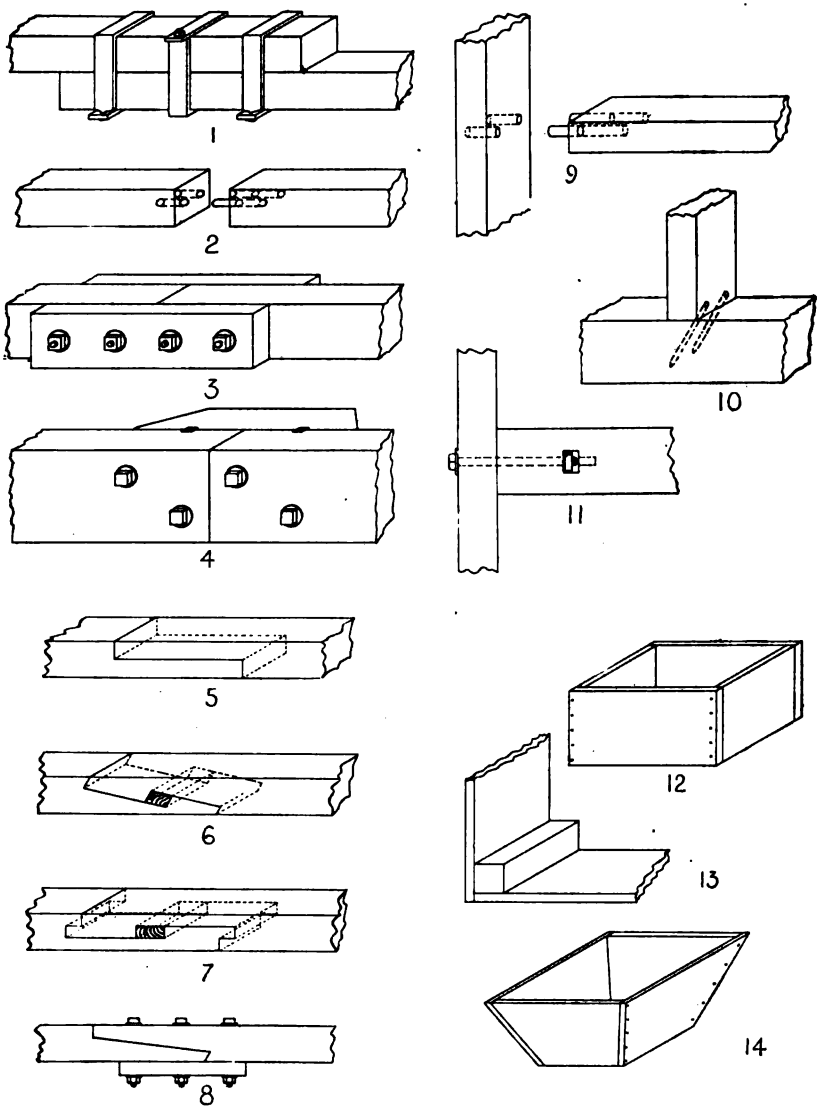

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19. A beveled halving is made like a middle-lap joint except that the upper end of the upper piece is thicker, so that the adjoining cheeks are beveled. It is very strong when loaded above. It was formerly used in house framing.

MODIFIED HALVING JOINTS.

20. A notched joint is made by cutting out a portion of one timber. It is used where it is desired to reduce the height occupied by the upper timber. Joists are notched on to wall plates.

21. A checked joint or double notch is made by cutting out notches from both the timbers so as to engage each other. It is used where a single notch would weaken a timber too much.

22. A cogged or corked or caulked joint is made by cutting out only parts of the notch on the lower piece, leaving a "cog" uncut. From the upper piece a notch is cut only wide enough to receive the cog. A cogged joint is stronger than a notched because the upper beam is not weakened at its point of support. It is used in heavy framing.

23. A ledge or rebate or rabbet is made by cutting out a portion of the side or end of a board or timber to receive the end or side of another. It gives more surface for gluing and makes a strong neat finish for boxes.

24. A dado or gained or grooved joint is made by cutting a groove in one piece into which the end or edge of the other fits. Shelves are frequently "dadoed" into their uprights. It is used for the bottoms of drawers and for water tight boxes.

25. A dovetail dado is made by cutting one or both of the sides of the infitting piece on an angle so that it has to be slid into place and cannot be pulled out sidewise. It is used in fine book cases.

MORTISE-AND-TENON JOINTS.

The tenon in its simplest form is made by dividing the end of a timber into three parts and cutting out rectangular pieces on both sides of the part left in the middle. The mortise is the rectangular hole cut to receive the tenon. The sides of the tenon are called "cheeks" and the "shoulders" of the tenon are the parts abutting against the mortised piece. The mortise is made slightly deeper than the tenon is long.

26. The common mortise-and-tenon or stub mortise-and-tenon is made by cutting only two sides of the tenon beam. It was formerly used for lower ends of studding or other upright pieces to prevent lateral motion.

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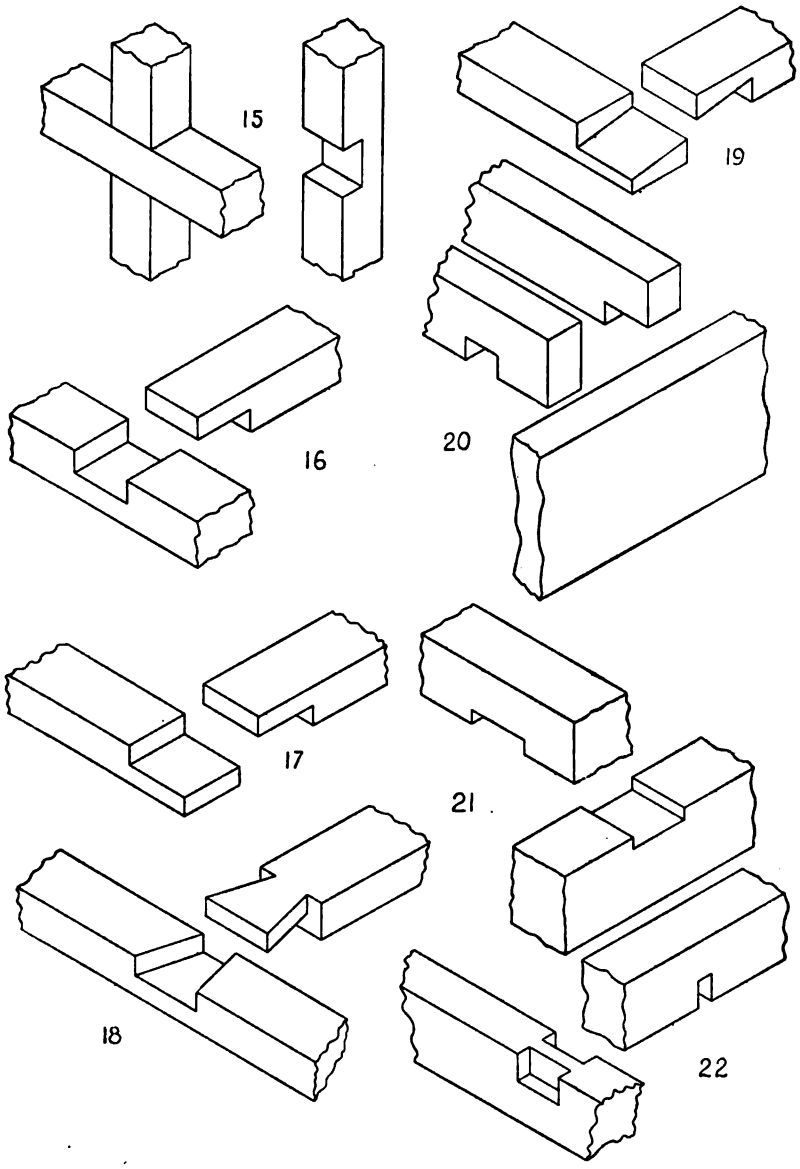

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27. The through mortise-and-tenon is made by cutting the mortise clear through one piece, and by cutting the depth of the tenon equal to or more than the thickness of the mortised piece. The cheeks of the tenon may be cut on two or four sides.

28. The blind mortise-and-tenon is similar to the simple mortise-and-tenon described in 26. The tenon does not extend through the mortised piece, and the cheeks of the tenon may be cut on two or four sides.

29. A wedge mortise-and-tenon joint is a through joint in which after the tenon is driven home, wedges are driven in between the tenon and the sides of the mortise. The wedges are dipped in glue or white lead before being inserted. The sides of the mortise may be slightly dovetailed. It is used to keep a tenon tightly fixed as in wheel spokes.

30. A wedged mortise-and-tenon joint may also be made by driving the wedges into saw kerfs in the tenon instead of along its sides as in 29. It is used in ornamental joints as well as in carpentry.

31. The fox-tail tenon is a blind mortise-and-tenon in which the mortise is made slightly wider at the bottom than the width of the tenon. Wedges are driven into saw kerfs in the tenon before inserting into the mortise; then when it is driven home the wedges spread out the tenon and make it fill out the mortise. It is used where the mortised piece is already in place so that a wedged mortise-and-tenon is impossible, and also in strong doors.

32. The dovetail mortise-and-tenon is a through mortise-and-tenon beveled on one side so as to form half a dovetail. The corresponding side of the mortise is also beveled and made wide enough so that when the tenon is pressed well up against its beveled side a wedge may be driven into the space left on the straight side. It is used to tenon a beam into a post especially where the post is fixed against a wall. It is also used in wood machinery.

33. A pinned mortise-and-tenon is one in which a pin is driven through holes bored through the mortised beam and through the tenon to keep them from drawing apart. It is used in heavy framing as in bridges, in wagon making, in window sash, etc.

34. A keyed mortise-and-tenon is one in which the tenon protrudes through the mortise far enough to receive a removable key and thus be drawn up tight to the mortised piece. It is used in work benches and in ornamental joints like knock-down bookcases and in other mission furniture.

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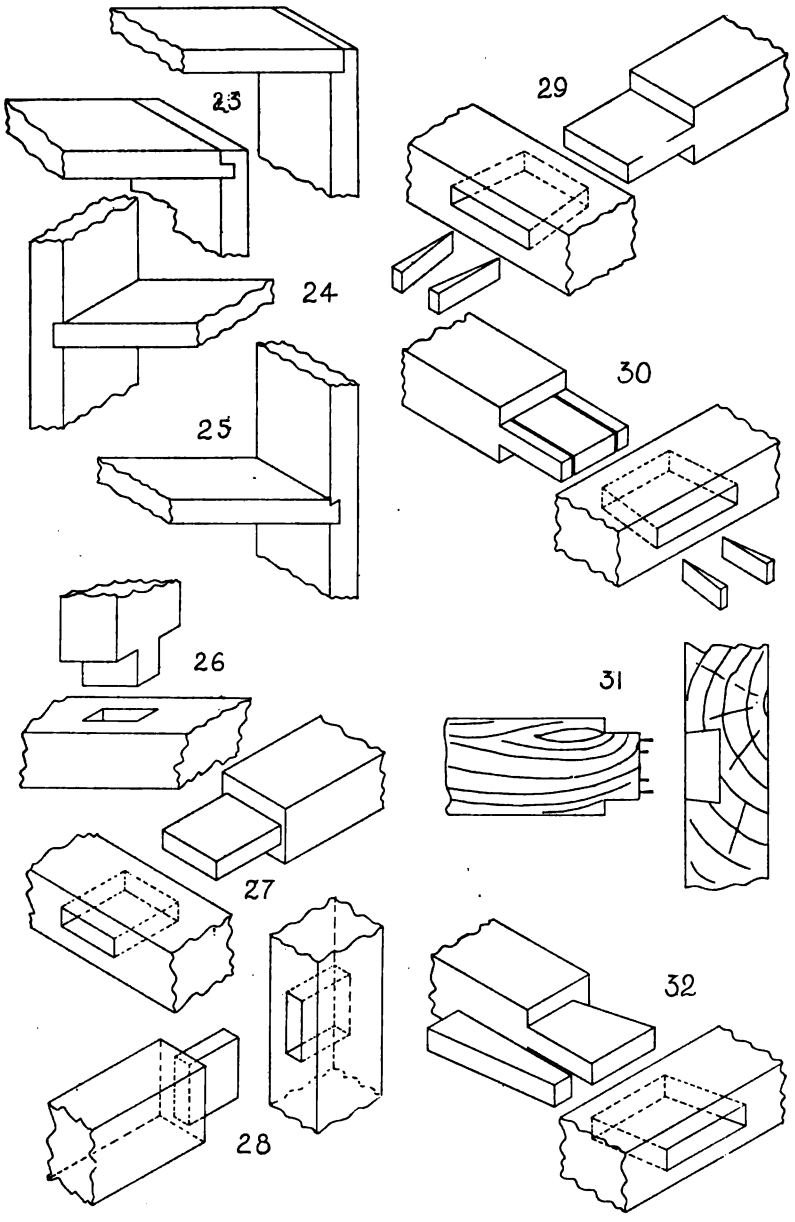

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35. A tusk tenon or shoulder tenon is one in which the tenon proper is quite thin but is reinforced by a thicker shoulder called a "tusk". The upper shoulder is beveled. The object of this form is to weaken the mortised piece as little as possible but at the same time to increase the strength of the tenon. It is used in joining tail beams to headers in floor framing.

36. The double mortise-and-tenon consists of two tenons side by side in one piece fitting into two corresponding mortises. It is used in joinery as in door frames, but not in carpentery.

37. A slip joint or end or open or box mortise-and-tenon is what would remain if a mortised piece were sawn off along one side of the tenoned piece. Window screens and other light frames such as those for slates and for printing photographs have this joint. This joint multiplied is used for small machine-made boxes.

38. A haunched mortise-and-tenon is made by cutting away part of the tenon so that that part of it will be much shorter than the rest. The haunch gives the tenon great lateral strength and saves cutting so large a mortise hole. It is used where the rail of a table meets the leg so that the end of the leg may be as strong as possible. It is also used in joining the rails to the stiles of doors.

39. A housed mortise-and-tenon is one in which the whole of the end of one piece of timber is let in for a short distance or "housed" into another. Treads of stairs are housed into string boards. It is common in grill work, and in railings.

Dovetailed joints are so named from the shape of the pieces made to fit one another. The proper angle for the dovetail is shown in 40.

40. The through single dovetail is made like the slip joint except that the tenon or pin is beveled so that it can only slip out one way.

41. The through multiple dovetail consists of a series of alternate projections and indentations in the end of each board. These are known as pins and sockets which form the joint by fitting one another closely. It is used in tool chests and in fine boxes.

42. The half lapped or half blind dovetail is a joint in which the pins on one board do not extend entirely through the thickness of the other board. It is used in joining the sides to the fronts of drawers.

43. The mitered, secret or blind dovetail is a joint in which only part, say one half, of both boards is dovetailed, the outer portion being mitered. The edges of the boards are also mitered right through for a short distance so that when finished the dovetails are invisible. It is used in highly finished boxes.

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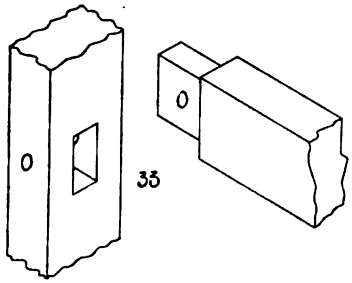

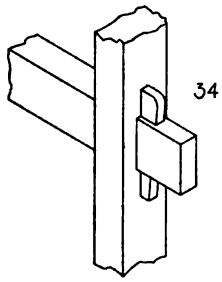

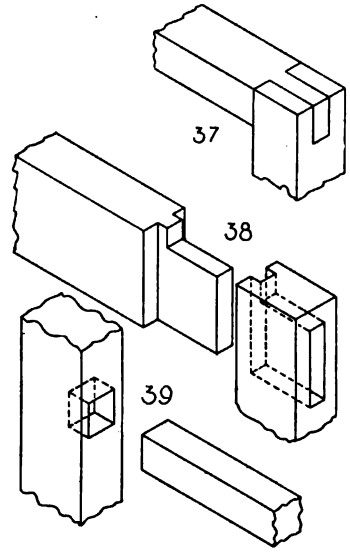

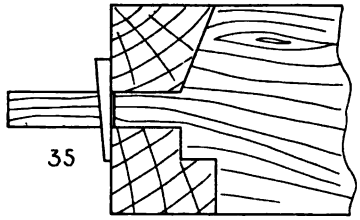

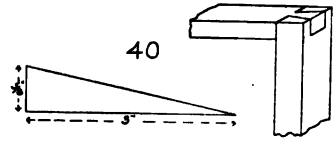

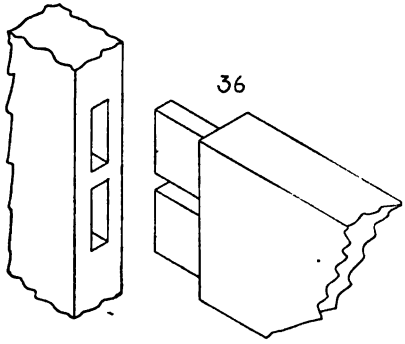

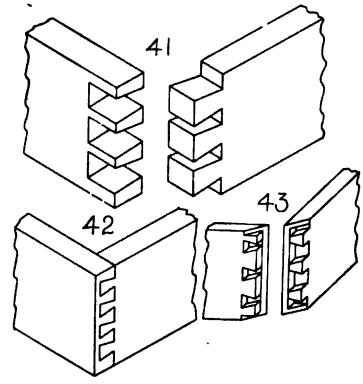

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A beveled joint is made by beveling the pieces joined so that the plane of the point bisects the angle at which the pieces meet. This is called the "miter" and may be 45 degrees or any other angle. It is neat but weak unless reinforced by a spline.

44. A plain miter is a joint where the beveled edges or ends abut and are simply glued or nailed together. It is commonly used in picture frames, inside trim, etc.

45. A plain miter may be strengthened by the insertion of a double-ended dovetail inlaid across the point. It is used by Oriental joiners.

46. A doweled miter is one in which one or more dowels are inserted and glued into holes bored into the beveled edges. It may be used instead of nails as e. g. in large picture frames.

47. A spline miter is one in which a "spline" or "feather" of thin wood is set into a saw kerf across the joint. It is used in picture frames and boxes.

48. A ledge and miter or lapped miter joint is made by rebating and mitering the boards to be joined so that the outer portion of the two boards meet in a miter. It is strong and good looking and may be glued or nailed. It is used for fine boxes.

49. A miter and butt joint is a simplified ledge and miter joint and is useful for joining pieces of different widths.

50. A stretcher joint is a slip joint in which one or both sides is mitered. It is used in frames for stretching canvass for paintings by driving wedges from the inside.

III. OBLIQUE ANGLES.

51. A strut joint is a form of miter joint used in making trusses.

52 and 53. A thrust joint or tie joint or toe joint is one in which two beams meet at an oblique angle, one receiving the thrust of the other. The toe may be either square as in 52 or oblique as in 53. The pieces are bolted or strapped together with iron. It is used for the batter braces of bridges.

54. A plain brace joint is one in which the brace is simply mitered and nailed into place. It is used for bracket supports.

55. A housed brace joint is a joint in which the brace is housed into the rectangular pieces except that the outer end of the mortise is cut at right angles and the inner end diagonally to receive the brace which is cut to correspond. It is much stronger than 54.

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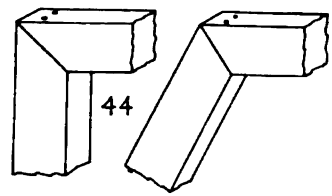

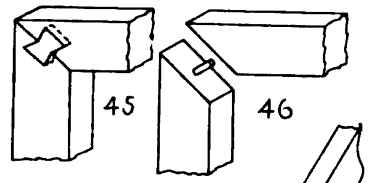

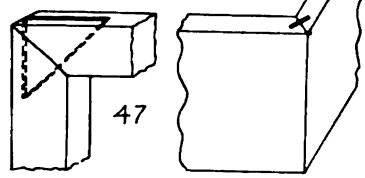

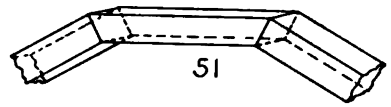

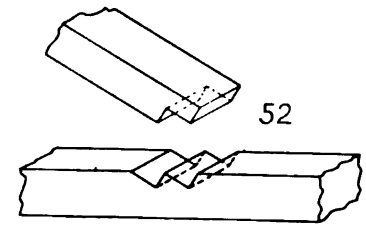

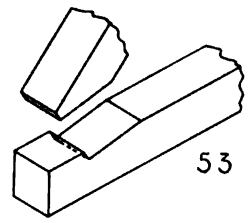

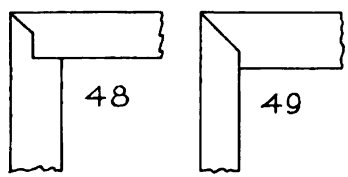

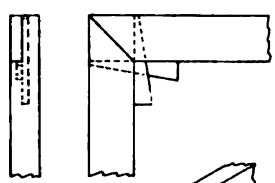

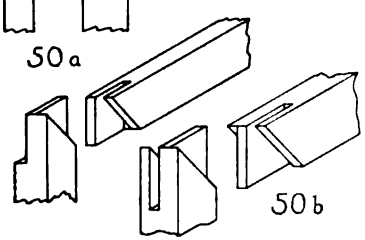

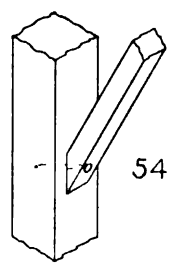

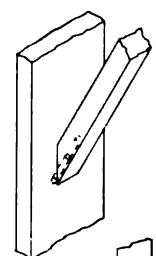

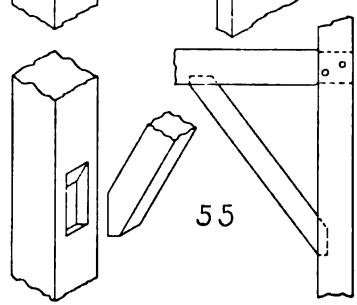

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56. An oblique mortise-and-tenon or bevel-shoulder joint is one in which the shoulders of the tenoned beam are cut obliquely and its end is cut off at right angles. The cheeks of the mortise are correspondingly sunk. By these means the tenon prevents lateral motion while the whole width of the beam presses against the abutment. Thus a much larger bearing surface is obtained. The whole is bolted or strapped together. It is used in heavy truss work.

57. The bridle joint is an oblique joint in which a bridle or "tongue" is left in an oblique notch cut out of one beam. Over this tongue is fitted a grooved socket cut obliquely in the other beam. It is used in truss construction.

58. The bird's mouth joint is an angular notch cut in a timber to allow it to fit snugly over the piece on which it rests. It is used in rafters where they fit over the plate.

IV. EDGE TO EDGE.

59. A plain or rubbed joint is one in which the edges of two boards are glued and rubbed together tight. It is used in table tops, drawing boards, etc.

60. A rebated, rabbeted or fillistered joint. Rebating is the cutting of a rectangular slip out of the side of a piece of wood. The re-entering angle left upon the wood is called the rebate or rabbet. A rebated joint, then is one in which corresponding rebates are taken off edges so that the joined boards may overlap. It is used in flooring and siding.

A board is rebated and filleted when two adjoining rebates are filled with a fillet.

61. A matched or tongue-and-groove joint is made by making a projection or "tongue" in the center of the edge of one board, and a corresponding groove in the center of the other so that they will match together. When used for flooring, the lower side of the grooved board is slightly rebated so that the upper edges will surely touch. This sort of flooring can be blind nailed.

62. A beaded joint is similar to a matched joint except that a bead is worked on one edge to disguise the joint for decorative purposes.

63. A spline joint is made by plowing corresponding grooves in the edges to be joined and inserting a spline or slip-feather. It is used in plank flooring.

64. A doweled joint is made by jointing the two edges carefully,

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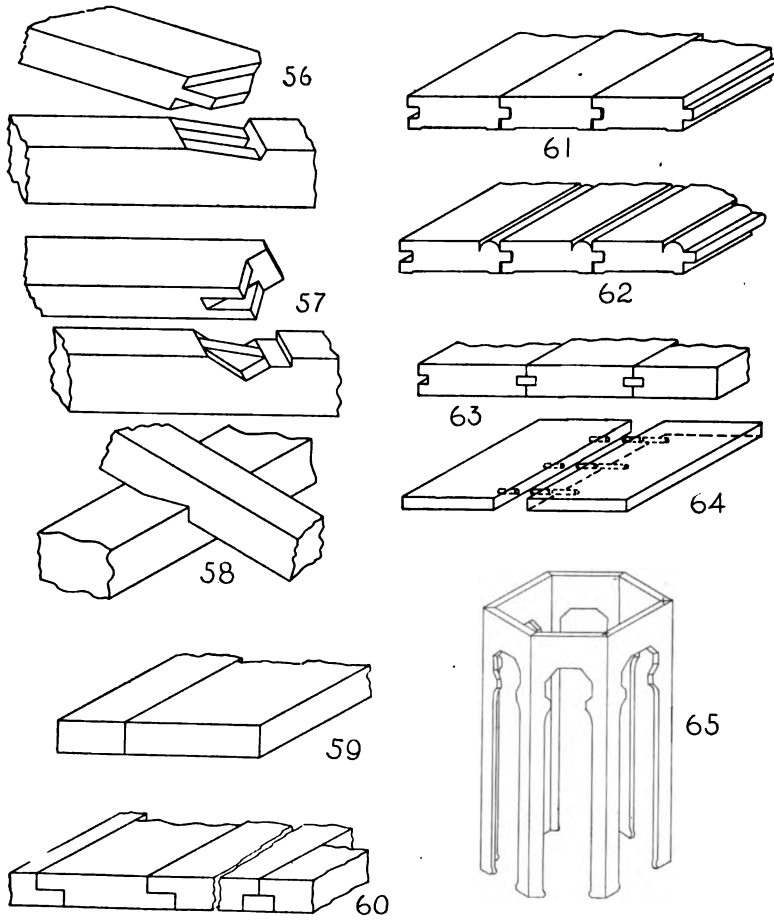

boring holes opposite each other and inserting dowel pins when the two edges are glued together. It is used in table tops, etc.

65. A long edge miter joint is made by mitering the long edges of boards to be joined. Since the object is usually good appearance, this joint is glued. It may be reinforced by inserting a slip-feather along the joint or corrugated nails in the ends of the pieces. It is used in taborets, pillars, etc.

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EDITORIAL

Experiments in Industrial Education. With the growing demand for a more adequate system of industrial education, the practical schoolman is beginning to devise ways and means of meeting it. To him has come the opportunity, more than to anyone else, to render a great service, and we hope he will make the best of it. We shall look for many enlightening experiments during the next few years. Already we hear of public high schools strengthening and multiplying their technical courses and we would not be surprised to learn soon that some public school had been organized to offer such a course as was outlined by Professor Paul H. Hanus, chairman of the Massachusetts Commission on Industrial Education, when he said:

> The industrial schools needed to-day to supplement the existing public schools should receive pupils fourteen to fifteen years of age who declare their intention to learn a trade, and would therefore be parallel to the existing high schools, but independent of them. Such schools would offer a course of study covering four years. The first two years would comprise general shop instruction with related drawing, mathematics, natural science, the history of industry and commerce, shop and business English, and the reading of appropriate articles and books.
>
> The last two years would give instruction for particular trades, and for each trade represented, the drawing, mathematics, physics, chemistry of that trade, the history of that trade treated both as special history and as a branch of general history, civics treated as concretely as possible, and English as before.

The essentials of such a school may easily grow up in connection with a manual training high school. Just as one group of studies now fits for the engineering college, another may train for the machine and building trades. Suggestions for such a group can now be obtained from the courses of study in the Wilmerding School of San Francisco. The proposed technical high school for Cleveland, Ohio, which President Howe of the Case School of Applied Science says will aim specifically to train young men to become successful manufacturers, may also offer some suggestions. But this industrial tendency and possibility in manual training high schools is perhaps best illustrated in the fourth year of the new course of study for the Stuyvesant High School in New York City, recently prepared by Dr. Frank Rollin, principal of the school, and the New York board of superintendents. The course is

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planned to be of special benefit to boys who wish to go directly from the high school to their life work. The old course will remain for the boys who wish to enter higher institutions of learning. The following is an outline of the new course:

FIRST YEAR.

English	5
Algebra	5
Freehand drawing	2
Mechanical drawing	4
Joinery and cabinet-making	10
Music	1
Physical training (with physiology and hygiene)	2
	29

SECOND YEAR.

English	3
Plane geometry	4
Chemistry	5
Freehand drawing	2
Mechanical drawing	4
Wood-turning, pattern-making, and foundry	10
Physical training	2
	30

THIRD YEAR.

English	3
Plane geometry and trigonometry	3
Physics	5
Modern history	3
Mechanical and architectural drawing	4
Forging and machine shop practice	10
Physical training	2
	30

FOURTH YEAR.

English	3
Shop mathematics	3
American history and civics	4
Advanced chemistry or economics or industrial and commercial law or applied mechanics, steam and electricity	4
Special shop practice in one of the following electives	10
(1) Building construction (carpentry, sanitation. including heating and ventilating, electrical wiring and installation.)	
(2) Advanced forging and tool making.	
(3) Advanced pattern making and foundry practice.	
(4) Advanced machine shop practice.	
(5) Industrial chemistry, lectures, and laboratory practice.	
Physical training	2
	26

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But high schools alone, no matter how technical they become, cannot solve the problem entirely. The great army of children, who are forced by circumstances to leave school and become wage-earners as soon as the law will permit, never reach the high school. If they are to be trained for industry it must be during the grammar school period. The problem of separating those who cannot go beyond the grammar school and providing for them a special school, or of giving optional industrial courses outside of the regular school hours or of revising the grammar school curriculum to meet the demands of industry is a difficult one, but we believe it will be solved. The Manhattan School for Girls, though a private institution, has already been a great inspiration to many who are studying this problem, and the work and results of such schools as Hampton and Tuskegee are being studied by more teachers than ever before. Every evening or day school, private or public, that takes pupils of grammar school age and gives them special training for industrial life may be furnishing data toward the ultimate solution of the great problem that is immediately before us.

In this connection we are reminded of the educational experiment just being inaugurated in Trenton, N. J. at the suggestion of Director Frederick of the School of Industrial Arts. Pupils of the public schools having special ability in drawing are to be gathered together at the Art School on Saturday mornings and given thorough technical instruction in art processes. This idea of developing natural aptitudes by selection and special training early in school life is not a new one—the suggestion comes from Europe—but it is of special interest just now as its aim is the best training for individual children with reference to later vocation.

Mr. Larsson Honored. Last winter Mr. Bahabha, inspector general of education of Mysore, India, was commissioned by his government to investigate the systems of manual training in England and America. After quite an extended tour through both countries he visited the Sloyd Training School in Boston and was so much pleased with the system he found there that before he left the school he expressed the desire that Mr. Larsson go to India for the purpose of introducing sloyd. On returning to his native land, Mr. Bahabha, in reporting to his government, suggested that an invitation be sent to Mr. Larsson. This suggestion was adopted. The official invitation came early in June and was at once accepted, leave of absence being granted by Mrs. Quincy A. Shaw the honored patron of the Sloyd Training School. On the way

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to India Mr. Larsson made a short visit to Sweden, his native land, and then left London for Bangalore about the middle of July. He will remain in India six months.

Mr. Larsson's work in India will be confined almost entirely to the training of a class of selected teachers and the arousing of public sentiment in favor of the work. The government hopes that at the end of six months some of the teachers in the class may be able to carry forward the work.

In this connection we recall that Gustaf Larsson came to Boston in 1888, and since that time has been adapting Swedish Sloyd principles to American conditions. His power to discriminate between essentials and non-essentials, his willingness to incorporate the making and use of working drawings into his system, and his general attitude of open-mindedness toward educational problems have enabled him to gain and hold the foremost place among American sloyd teachers, and have placed him in the very first rank of all American teachers of manual training. The work of no other man has had greater influence upon manual training for the upper grammar grades. Mr. Larsson is not merely an exponent of the principles formulated by Herr Salomon of Nääs, under whom he received his training; he represents the broader American sloyd which cannot be separated from other American work in manual training. But if such a separation could be made, sloyd would be found to contain much that is most likely to be permanent in what has yet been really attained in American manual training.

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ASSOCIATIONS

WILLIAM T. BAWDEN, Editor.

NATIONAL EDUCATIONAL ASSOCIATION.

The Los Angeles meeting marked the fiftieth anniversary of the organization of the N. E. A. It will rank as one of the most important meetings of the Association because of the adoption of the Charter and the successful bridging over of the trying period caused by the omission of the San Francisco meeting and the present disturbed railroad situation.

The tendency, so noticeable during the last decade, to give the school and its curriculum more of social content and to bring it into closer contact with social needs and conditions was markedly in evidence at all of the sessions. The Manual Training Department, the first representative of this movement to obtain recognition from the National Association, has this year to welcome as its allies two new Departments, the organization of which has been made necessary by the growing influence of this movement, and whose assistance will render possible a more thorough working of the field and more efficient and fruitful investigation. The department of Technical Education will confine its attention mainly to the field of higher education, and the Department of Agricultural Education will make special study of the rural school and agricultural college.

The attendance at the sessions of the Manual Training Section and the active interest displayed by all were most gratifving. Our most hearty appreciation is due the retiring President, Frank M. Leavitt, of Boston, for a well organized program with its timely discussions of problems urgently demanding solution and for the selection of speakers who from wide and successful experience were able to offer many valuable suggestions.

The first session, a joint session with the Art and Elementary School Sections, was held on Tuesday afternoon, July 9th. The general topic under consideration, "The Development of an Adequate Course of Study in Manual Training for Elementary Grades," was discussed from three main points of view: (1) that of the teacher of the manual arts, by August Ahrens, State Normal School, Warrensburg, Mo.; (2) that of the child-study specialist, by Professor Dresslar, University of California; (3) that of the school superintendent, by Charles H. Keyes, Hartford, Conn.

George W. Eggers, Chicago Normal School, was to have discussed the subject from the first point of view but was unable to be present. Mr. Ahrens who was on the program to discuss Mr. Eggers' paper kindly consented, on short notice, to fill the gap. "I would have you conceive," said he, "the main definite end of manual training for the individual to be the systematic training of the hand in construction work through the use of tools and the manipulation of materials, and the acquisition of facts and ideas that make for power and efficiency in social and industrial service." He emphasized *content* as well as *training,* and placed ways and processes above the finished product. The finished product is but the concrete approach to the end—an adequate course flexible and graded to suit the varying stages of the child's development. While ad-

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vocating due regard to the natural interests of children he affirmed that "The course will not grow out of fleeting, spasmodic, and temporary impulse or fancy of childhood into a fragmentary unrelated scheme of training, but temporary interests and needs will be wisely directed and shaped towards purposeful and permanent ends."

Professor Dresslar, who followed, claimed that manual training in its future larger and truer sense would mean learning how to enter into organized activity with the hand, whether in the use of tools or on the playground, on the farm or in the fishing-smack. He deplored the lack of depth and breadth of youthful experience that characterizes the children in our cities. The needs of children demand that their growth in consciousness be a direct result of the organizing and relating of sense stimulation through motor activity. As the feelings are in large measure the resultant state of consciousness growing out of the present state of muscular activity, manual training is to that extent emotional training and closely related to physical training. He pleaded for the mental enrichment of the work, giving the child greater power to feel, to think, and to express hinself. The natural normal child makes plain the relative values of the many varieties of work offered. We are too prone to force upon him some finely worked out scheme that we have evolved out of our own mature consciousness. He suggested a school farm as a necessary part of every city system.

The choice of the last speaker of the session was indeed a happy one. Supt. Keyes in a brief address indicated the essential points as seen by the administrator and suggested a definite way of reaching something tangible. He claimed that the responsibility for the inadequacy of our courses rests on the superintendents and principals. They must see to it: (1) that proper time opportunity is provided for accomplishing something worth while; (2) that the course be placed, not only formally but through the spirit of the whole school staff, on an equal footing with the other subjects; (3) that no attempt be made to lay out the actual work before consultation with a manual training instructor, an art teacher, a master of child-study, a physical culture teacher, and an efficient grade teacher; (4) that they themselves are responsible for the proper correlation of *educational endeavor* and *effective teaching,* rather than fanciful and ingenious schemes for correlating subjects; (5) that they give adequate recognition to the environment of the school as a factor. We are not to dream of a uniform course even for one state; that would be both unwise and unfortunate. At the same time all courses must recognize the fundamental nature of the child.

Following the suggestions of Supt. Keyes the Committee on Resolutions reported as follows: "Whereas, the cumulative work of the Department during the last two years in seeking a more rational statement of courses of manual training seems now to indicate a necessity for some definite work by a special committee: Be it therefore Resolved,—That the Manual Training Department of the N. E. A., now in session, recommend the appointment of a committee for the purpose of collecting data of the manual training work done throughout this country, that suggestive courses adaptable to various conditions found therein may be formulated by it. Further, be it resolved,—That this committee consist of three persons now actively engaged in manual training, with power to add to their number a superintendent of schools, a teacher of art, a child-study specialist,

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a grade teacher, and representatives from such other departments as may be deemed advisable to increase the efficiency of its work. Further, be it Resolved,—That the committee be appointed by the President for a term of two years and be requested to make a preliminary report at the next meeting of the Association."

The resolution was adopted unanimously and the usual steps were taken to obtain an appropriation from the Board of Directors. The Board set aside the sum of $500 for the use of the committee. Later in the week President Leavitt appointed the following to act on this committee: B. W. Johnson, supervisor of manual training, Seattle, Wash., chairman; H. D. Brundage, Stout Training Schools, Menominie, Wis.; Miss E. E. Langley, School of Education, Chicago.

The second session was held on Thursday morning, the general topic under discussion being, "The Relation of Industrial Education to Public Instruction." Magnus W. Alexander, of the General Electric Co., Lynn, Mass., was unable to be present to present his paper on, "Industrial Training as viewed by the Manufacturer."

B. W. Johnson, Seattle, Wash., limiting his discussion to the high school as it exists at present, pointed out that during the first two years the students are too immature and too limited in general experience economically to undertake definite industrial training. We should see to it that during these years the students get the necessary enrichment of experience and gain in maturity so that with economy both to themselves and to society they can receive definite industrial training during the last two years. The first two years would enable the individual to discover his special aptitude and to lay a general foundation for subsequent special work. The work should be closely related to the activities of the community. The girl should receive as generous treatment as the boy.

Jesse D. Burks, Teachers' Training School, Albany, N. Y., followed with a discussion of that most perplexing part of the problem, the later years in the elementary school and the transition to the high school in the case of the favored few or out of the school into the actual life of affairs in the case of the great majority. He emphasized the fact that our whole educational system is weakest just at this point, and set forth in the following propositions what he deemed a true statement of the situation and its remedy: (1) there is a widespread feeling among pupils and parents that the last two or three years of the elementary school course are of less practical value to children than the same years given to vocational pursuits: (2) investigation shows that under present conditions the years between the ages of fourteen and sixteen, whether spent in school or at work, are for the great majority of children wasted years so far as industrial efficiency is concerned; (3) the work of the last few years of the elementary school, like that of the traditional high school, disregards differences in native capacity and in prospective careers of pupils although these differences appear with increasing force at the very time when the children are passing through these years; (4) the systematic recognition of special aptitude in the organization of school work supplies the rational basis for secondary as distinguished from elementary education—the division between elementary and secondary education is at present made too late; (5) under an adequate system of secondary schools, boys and girls would be made conscious of their individual powers, and thus would be enabled to adjust themselves rationally, rather than

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fortuitously, to the requirements of social life; (6) with proper data concerning the inheritance and personal development of individual pupils, it would be possible for teachers and school officers in co-operation with pupils and parents to determine with considerable accuracy the careers for which individuals are best fitted; (7) it may be assumed that, on the whole, chidren will remain in school as long as they and their parents regard it as distinctly to their advantage to do so and economic conditions do not prevent; (8) the conclusion clearly indicated by the foregoing is that adequate provision for vocational training beginning at about the sixth year of school would tend to prolong the school life and increase the vocational efficiency of the great mass of children, especially of those who enter industrial and domestic pursuits.

The closing session of the Department, a joint session with the Department of Indian Education, was held on Friday morning. Three very suggestive papers were read. Elbert H. Eastmond, Brigham Young University, Utah, discussed "Rational Art and Manual Training in Rural Schools." He dealt with work, aims, method, and materials, mainly from the elementary side. His photographs of work from various schools in Utah were very suggestive. M. Friedman, Haskell Indian Institute, Kansas, gave a general idea of the special adjustments necessary when presenting the work to Indian boys and girls. Miss R. M. Hodge, Los Angeles, discussed the value of the work in dealing with the immigrant child—from southern and south-eastern Europe, the Orient, and Mexico—and the sub-normal or physically deficient. This paper closed the session.

Jesse D. Burks, Albany, N. Y., was elected president of the Department for the ensuing year.

JAMES COLLINS MILLER,
Throop Polytechnic Institute,
Pasadena, Cal.

THE SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION

The Society for the Promotion of Engineering Education held its fifteenth annual meeting at the Case School of Applied Science in Cleveland, July 1st to 3rd, 1907. The program dealt very largely with technical school problems of such a nature as to be hardly of interest to Manual Arts teachers.

On Wednesday morning, Calvin M. Woodward was called to give the report of the Committee on Industrial Education. He prefaced his report by announcing that what he had to say could hardly be called a report of the Committee, but a statement of his own personal opinion. He heartily endorsed manual training in the secondary schools as the greatest step in industrial education. It serves to train the youth for work in industrial fields and is the best feeder of the higher technical school. Thus the modern product is both theoretic and practical. The engineer who can both plan and execute is the most important asset of the manufacturer. Manual training has another important result in making the schools attractive and worth while.

The advanced trade schools founded by corporations, with a broad education as a prerequisite are also to be encouraged.

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There are two classes of boys whom the secondary schools do not reach, and for these provision should be made. First, those who from taste or necessity, nearly 85 per cent. never enter secondary schools. Upon these, the greatest influence should be brought to bear to enter either a manual training or classical school or a vocational school. Each boy should be free to choose his school. The manual training school is the ideal in which one third of the time is given to mechanic arts, two thirds to cultural studies. The vocational school, giving two thirds of the time of mechanic arts is educationally narrower than the manual training school.

The second class of boys includes those from 18 to 24 years of age who have had little industrial education and are working through the day. To these should be offered the privileges of the mechanical plants of the schools, during the hours when the equipment stands idle. Such could be of advantage in night schools. Professor Woodward mentioned a Sunday morning school in St. Louis, in which he was personally interested, and which proved very popular.

Mr. Woodward's talk was supplemented by Professor Williston of Pratt Institute, a member of the Committee, who enumerated without particular comment the movements in industrial education throughout the country.

The topic of the day which excited the most discussion and comment was The Co-operative Engineering Course at the University of Cincinnati, presented by Professor Herman Schneider, for the University and Chas. S. Gingrich of the Cincinnati Milling Machine Co., for the manufacturers. In introducing his subject, Professor Schneider said that he was reading this paper at this time under protest, as he would prefer to present it three years hence. The Co-operative course has been in operation but one year and the experiment is new. The course covers six years and includes all of the university work taken by the pupils of the regular four-year technical course, and a thorough experience in the practical shopwork in all of the various departments of the Cincinnati Milling Machine Co. The shopwork alternates week by week with the class-room work through six university years, and is continuous during the summer. The boys receive daily wages increasing until a maximum of 21c per hour is reached in the sixth year. While their wages at first are not sufficient to pay all expenses, they have the opportunity of borrowing from a loan fund, all of which with careful planning they can repay by the end of the six years.

The advantages of this course to both the employer and the young man are apparent and manifold. The manufacturer secures men of a high type, trained to fit the particular needs of his shops—men who can design with a knowledge of details, as well as execute. The young man early gets an intimate knowledge of business methods, manufacturers' processes, good address and broad sympathies through a close association with labor conditions and attitudes, a uniform development for life—finally, the essentials making for good citizenship. What is possibly more material, he can at the close of his college course, command a salary large enough to be attractive to him.

Mr. Chas. E. Downton gave an interesting account of what the Westinghouse Electric and Manufacturing Co., is doing towards the education and social betterment of its employees, through special apprenticeship courses and co-operative societies.

H. E. R.

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THE ILLINOIS MANUAL ARTS ASSOCIATION.

The executive committee held two meetings at Cleveland, O., at the time of the meeting of the Western Drawing and Manual Training Association, at which time several important features of the 1908 meeting were decided upon.

It was decided to lengthen the program by providing for three sessions instead of two: Friday afternoon, Friday evening, and Saturday morning. The principal features of the Friday afternoon session will be the reports, with discussion, of two committees: the committee on course of study in the manual arts for primary and intermediate grades, Seymour L. Smith, DeKalb, chairman; and the committee, William F. Raymond, Peoria, chairman, appointed to investigate the general question of "belt-driven versus individual-motor-driven machinery for manual training equipments."

It is expected to have the usual Banquet at the Friday evening session, followed by addresses. The Saturday morning program will include a discussion of the course of study in shopwork prepared by a committee, C. A. Bennett, chairman, for the State Course of Study.

The date of the meeting is February 7-8, 1908.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The election of Chas. A. Bennett as president of the Western Drawing and Manual Training Association has necessitated the reorganization of its editorial board. William T. Bawden of Normal, Ill., is now chairman and F. H. Selden of the University of Chicago is in charge of the advertising. The only member of the old board still remaining is Ira S. Griffith of Oak Park. This board is now acting in conjunction with the editorial committees of the Eastern Manual Training Association and the Eastern Art Teachers Association in getting out the report of the Cleveland Meeting.

It is probable that the date of the next meeting of the Association, which is to be held in Indianapolis, will be a little earlier than usual. April 8-11 is convenient for the Indianapolis local committee and will probably be adopted by the executive committee of the Association.

The August number of the *Manual Training Teacher* contains the Fifteenth Annual Report of the affairs of the English National Association of Manual Training Teachers as prepared by the Executive Council of that body. Among other things the following points are recommended to the Association "as deserving very earnest deliberation:—1. The proper systematic training in a duly organized training college of those who wish to become manual training teachers. 2.—That it is high time that manual training should be not only obligatory, but taught in hours which make a manual training lesson equal in duration to a whole morning or afternoon session of the ordinary day school. 3. That tool-sharpening and the like are a part of the child's training in the manual training classroom, and should not be made the subject of extraneous tasks forced upon the teacher to carry out in his spare time."

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SHOP PROBLEMS[1]

GEORGE A. SEATON, Editor.

CUTTING BOARD.

A problem almost as old as manual training itself is what is commonly called the cutting board. That it has value as a model is evidenced by its continued use and perhaps it will bear repeating for the sake of the slight change which W. A. Van Deusen of the Cleveland Central Manual Training School introduces. This consists of the cutting of a groove across the under side into which a cross strip is tightly fitted. This addition not only offers an opportunity for excellent practice in the use of tools but also has a certain historical interest. In the days when smooth pieces of board were not so easily obtained as at present, the cutting board was the result of considerable labor and it was worth while devising some scheme for prolonging the time of its use. Accordingly the cross strip set in the back took the brunt of the wear and could be renewed from time to time, while the front remained unmarred as it hung conspicuously on the wall. In addition to the chance offered of renewing the surface subjected to the most wear, the fact that the grain of the wood ran in the direction of the cut tended to decrease the rapidity with which the knife was dulled. Ordinarily the board was made larger than the one shown in the drawing, which has been reduced to a size adapted to school needs.

PADDED STOOL.

A project which never fails to interest the boys and one of which they are always sure to be proud when it is completed is the little footstool. As shown with dowel joints it is very easy to construct but very serviceable. If preferred, it could readily be made with the mortise-and-tenon joint in place of the dowel joint. Another change that might be made is the using of cleats to support the top board instead of rabbeting the rails. The top of the posts can be given a number of different shapes according to the ability of the worker.

The upholstering takes considerable care to be a success. Genuine leather may be used as a cover or one of the imitation leathers, of which that known as Chase leather is excellent. If this is used as shown in the drawing, going clear over the rails, a piece about 16 by 20 inches will be needed. Instead of doing this a piece about 11 by 15 inches may be used and brought down but a half inch over the rails. In this case it will be necessary to finish the edge with a piece of gimp. For padding either tow, moss or curled hair may be used and the amount will depend upon the material. From a half pound of tow to ¾

[1]NOTE: What is being attempted in this department is merely suggested in this issue. It is expected that later issues will reveal more fully its plan and scope. To be most successful such a department cannot be the work of one man, nor even can it be the work of many under the initiative of one. Its greatest success means that all the readers must volunteer any valuable ideas with which they become acquainted. Though such ideas may seem old to the contributor, they may be new and valuable to many readers of the Magazine. We ask then the honest criticism and hearty support of all who find this department interesting.—*Ed.*

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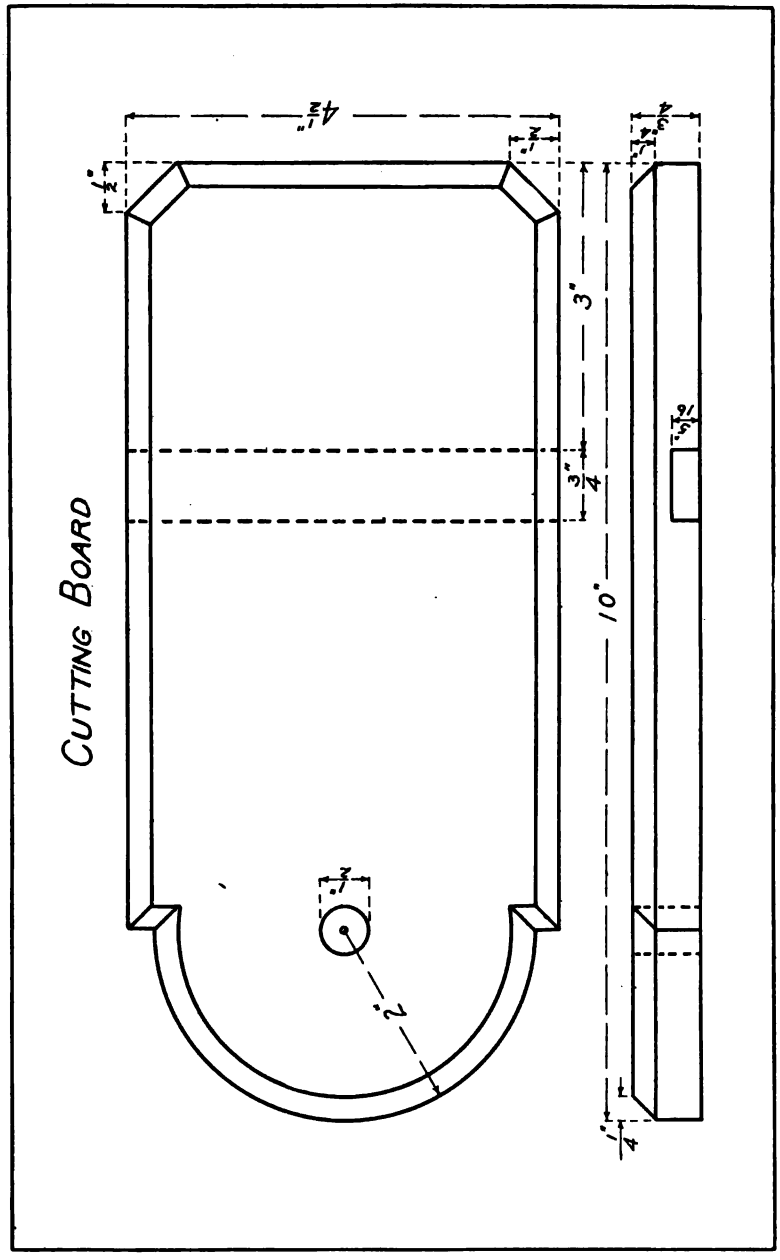

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pound of curled hair will be ample. The first step will be to lay a stick about an inch thick lengthwise of the stool on the rails. Over this is stretched a piece of muslin 11 by 15 inches which is temporarily tacked in place along the upper edge of the long rails. The stick can now be removed and the padding forced in from both ends until the top is neatly rounded into shape. A tack is first placed in the center of each of the shorter sides which may now be tacked in place by working from the center towards the corners. Any large lumps in the top can be removed by loosening the tacks on the long sides and stretching the muslin tighter over the lumps. The corners are the last to be tacked in place and can be fitted by making a 45-degree cut just far enough in from the outside corner to make a tight fit around the post. Care must be taken to get plenty of padding in the corners. All tacks may now be driven home and the leather put in place much like the muslin, working from the center of the sides toward the corners. The leather is held in place by ordinary tacks driven in the under edge of the rails in the stool illustrated, or along the upper edge of the rails where the leather does not cover them. Any extra leather should be trimmed off with a sharp knife and the large gimp tacks put in for ornament. Where it is desired to have the top especially smooth and free from bumps some cotton batten should be placed under the leather.

TABOURET.

Walter M. Mohr's article on the "Decorated Shop Model" (1905 Year Book of Council of Supervisors of the Manual Arts) suggested the lines of the tabouret shown, though the dimensions given are those used in East Cleveland. This makes an excellent application of the mortise-and-tenon joint and can be modified by using four legs instead of two.

LETTER RACK.

Those who noticed the exhibit of the Bradley Polytechnic Institute at the last manual training convention will be interested in the drawing of the brass letter rack which was there given with the several steps in its making. Aside from its beauty it has a worth in suggesting the possibilities in a field now just beginning to be developed, namely that of metalwork which may be undertaken with a very few hand tools. Especially as this metalwork is combined with wood are the prospects attractive. The forming of the wooden back is but a simple problem in woodwork but the different steps undertaken in forming the brass part are instructive in showing how few the tools needed in the work. After the outline has been laid out upon the metal, a series of prick punches are made just inside the outline which serve to center the drill which is next used. By placing these holes close enough together it is an easy matter to cut out the metal occupying the open spaces and a little work with the file brings the piece to dimensions. The piece is finally bent to shape, polished and riveted.

THE ELECTROPHORUS.

The electrophorus has proven itself to be an interesting model for seventh grade boys in Watertown, Mass. It offers a simple method of generating a supply of electricity with which a number of experiments, such as are suggested in

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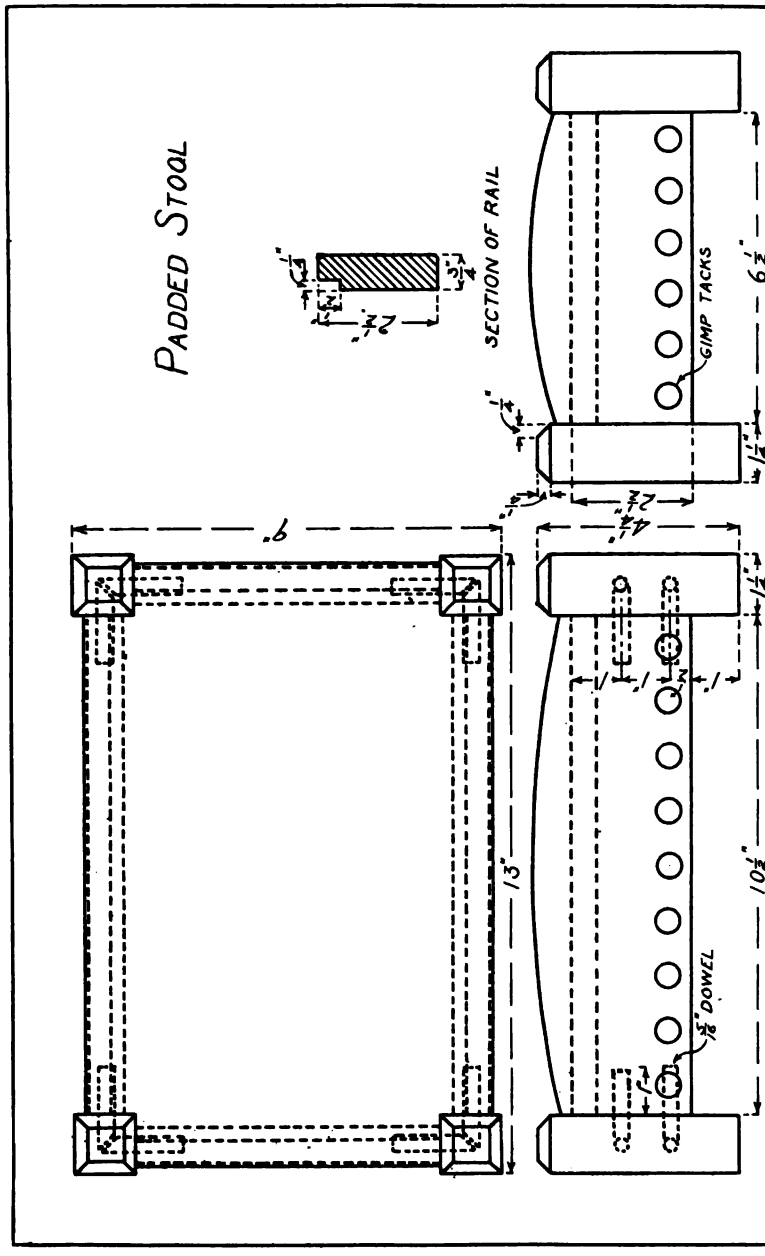

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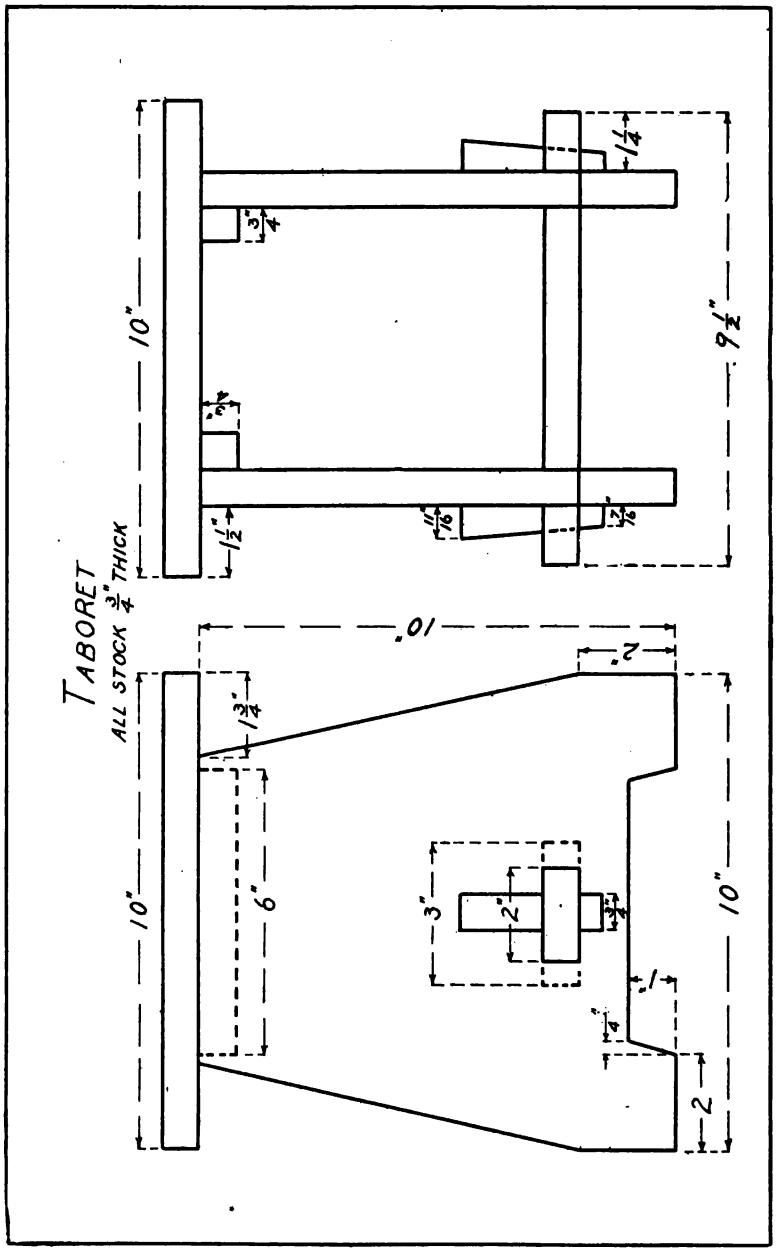

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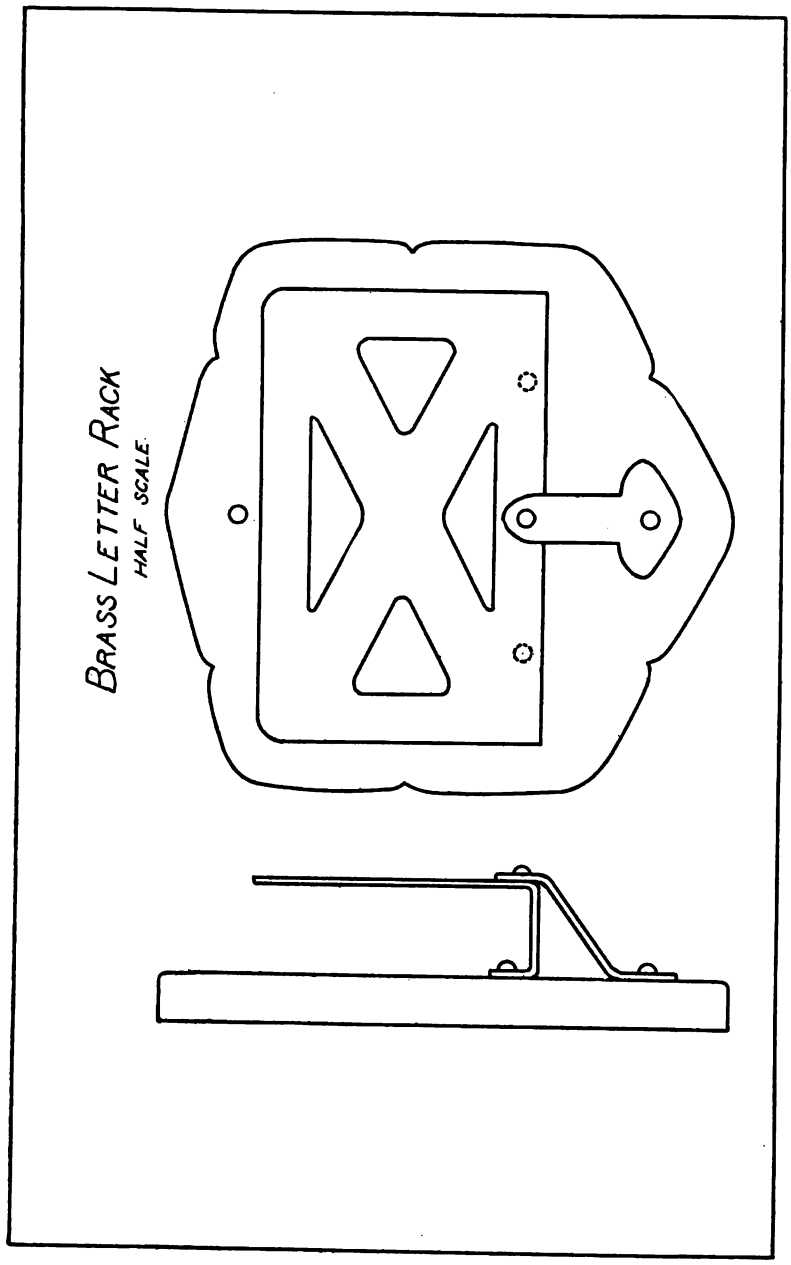

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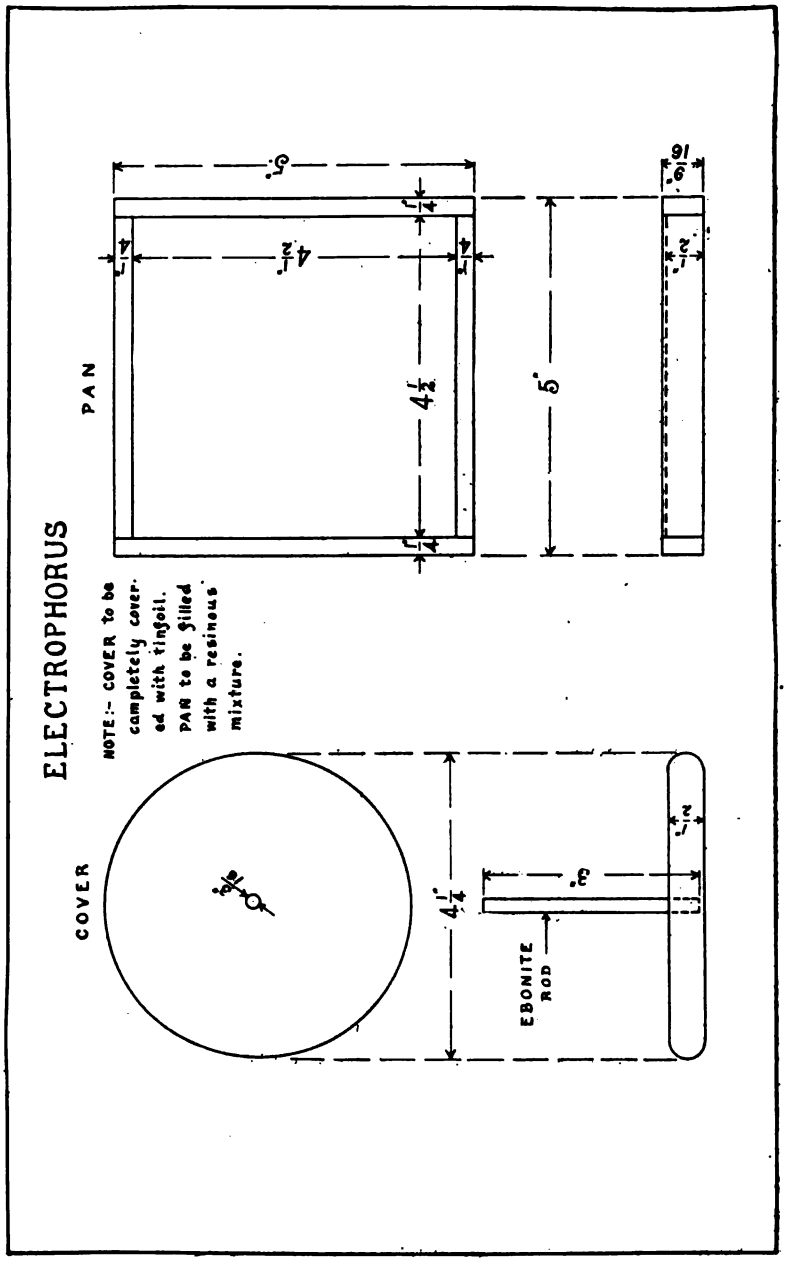

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text books dealing with electricity, may be performed. Under favorable conditions of cleanliness, dryness, and warmth, sparks ⅜-in. long may be obtained.

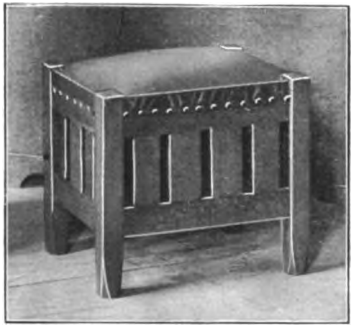
The cover should be well sandpapered before the tinfoil is glued to it. Two circles of tinfoil 4¾-in. in diameter may be cut from tinfoil obtained at a tobacco store and their edges overlapped as smoothly as possible when glued to the cover, for electricity escapes rapidly from sharp corners and edges. An ebonite rod can be made from a rubber comb or other piece of hard rubber, or secured at a hardware store. It should fit snugly into the cover.

Before the pan is filled with the resinous mixture it should receive several heavy coatings of shellac to prevent air bubbles from the wood when the warm mixture is poured in. This mixture is of fourteen parts by weight of resin, four of thick shellac, two of turpentine, and one of paraffine. The melting should be done in a rather large vessel as compared with the amount to be melted because the materials are quite inflammable and the heat causes an abundance of air bubbles, which however mostly pass away with continued stirring as the mixture cools to the right consistency for pouring. After the mixture has been allowed to harden in the pan it should be made as flat as possible by scraping or sandpapering.

Sealing wax alone makes a good mixture.

To generate electricity rub the mixture briskly with woolen or fur for a minute or two in a warm, dry atmosphere. Then, handling the cover by the ebonite rod, place it upon the pan, touch its upper surface with the finger, then lift it from the pan and it will discharge a spark upon any conductor brought near to its rounding edge.

HARRIS W. MOORE.



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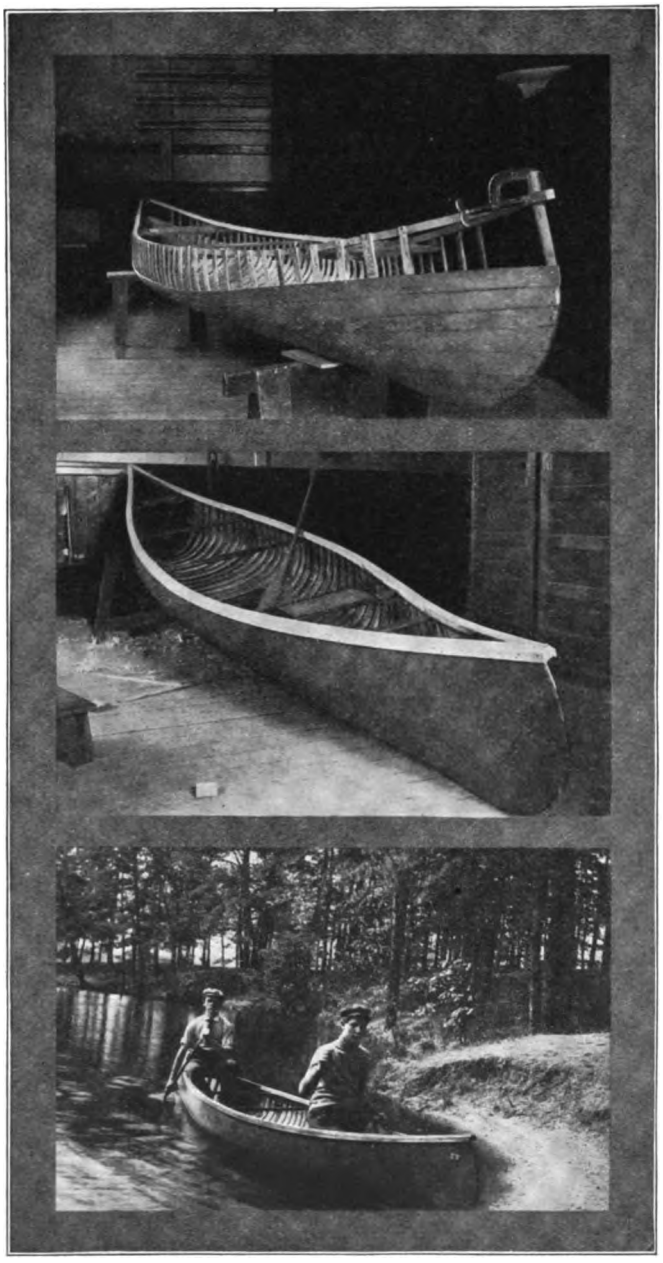

MADE BY BOYS IN GRAMMAR GRADES, SPRINGFIELD, MASS.

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CURRENT ITEMS

CLINTON S. VAN DEUSEN, Editor.

Professor W. F. M. Goss, known to manual training teachers as the author of "Bench Work in Wood" but more generally known as an engineer of wide experience and the dean of the department of engineering at Purdue University, has accepted the position of dean of the College of Engineering of the University of Illinois. He will also be the director of the newly organized School of Railway Engineering.

John W. Curtis, for the past two years in charge of the manual training department in the provincial normal school at Cebu, Phillipine Islands, has resigned his position to return to "The States" on account of the tropical climate in Cebu. It is to be hoped that the work, so well begun by Mr. Curtis, will fall into the hands of someone able to carry it forward in the same spirit.

Dr. Ernest B. Kent, from the B'nai B'rith Manual Training School, Philadelphia, Pa., is to be director of industrial and manual training at Jersey City, N. J. Clarence S. Moore, who has had the manual training at Manor School, Stanford, Conn., and George F. Foth who has been supervisor of both drawing and manual training at Ashbourne, Pa., are to assist Dr. Kent.

John Thompson, who has been director of manual training at Braddock, Pa., is to be director of manual training in one of the Pittsburg, Pa., schools.

John N. Lobdell, has the manual training work at the MacKenzie School, Dobbs Ferry, N. Y.

Chas. O. Atwater is to be instructor of manual training at Montclair, N. J. He has been in the public schools, Indianapolis, Indiana, for the last few years.

Howard B. Berry and Walter I. LeRoy are to teach manual training in the New York public schools.

Addie G. Reeves is to teach manual training in the new York Orphan Asylum at Hastings, N. Y.

Julian A. Burruss resumes his work as director of manual training at Richmond, Va. Mr. Burruss has been studying at Teachers College for the last two years and supervising the Richmond work.

Thomas K. Lewis returns to his work at Ohio State University after a year's leave of absence.

George H. Nutt returns to his work at the George School, Swarthmore, Pa., after a year's leave of absence.

Howard S. Harris is to have charge of the manual training work at the Orthopedic Industrial School, White Plains, N. Y.

Fred Thorne has the work in manual training at the Hackley School, Tarrytown, N. Y.

Miss Worthy Johnson is to assist in manual training and have the domestic science work at the State Female Normal School, Farmville, Virginia.

Shizuka Utsumi is to be director of manual training in one of the higher

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technological schools in Japan. Mr. Utsumi was given a year's leave of absence by his government to study in this country.

Paul Buhl a graduate of the University of Minnesota is now teaching manual training at Wheaton, Minn.

Bessie Savage of the University of Michigan is now teaching manual arts at Valley City, N. D.

E. Franklin Zoerb who has attended the University of Minnesota is now teaching manual training at Menominie, Wis.

Mr. Loffhagen, who has been a teacher in the shops of Washington University, St. Louis, Mo., discontinued teaching at the end of last year.

T. M. Wood takes the principalship of the Labette County high school at Altamont, Kan. One requirement that the board made of the principal was that he should be qualified to teach manual training.

Wm. Curtis is now in charge of manual training in the schools of Houston, Texas.

Harry King has been transferred from one of the district manual training schools of St. Louis to the Yeatman High School of that city.

Oscar Chaney a graduate of the Normal Manual Training School at Wichita, Kan., has charge of the manual training work at Parsons, Kan.

Chester B. Lambirth, who taught forging in the Central High School at Cleveland, O., is now in the high school at Brocton, Mass.

Helen F. Ekstrom of the public schools of Springfield, Mass., has accepted a position as teacher of manual training in the public schools of Boston.

Fannie B. Prince, teacher of manual training in the Roger Wolcott School of Boston has resigned to devote her time to her parents.

Ernest W. Beck, formerly assistant in the Eliot School, Jamaica Plain, Mass., has accepted a position as teacher of manual training in the public schools of Trenton, N. J.

The following changes among manual training teachers is reported from Georgia: J. P. Campbell who has been in charge of an industrial school experiment in the western part of the state has been elected to direct industrial work in the Third District Agricultural School at Americus; Ira Williams has been elected to a professorship in one of the district agricultural schools. Miss Thursby, formerly teacher of manual training in the Hancock Co., schools is supervising hand work in Dublin.

Wm. M. Towle is the new Superintendent of Shops at the Clarkson School of Technology at Potsdam, N. Y.

Leslie D. Haynes, who has had charge of manual training in the Rayen School at Youngstown, O., goes to Cornell University as an instructor. His position at Youngstown is filled by Clyde E. Wilson formerly of the Manual Training High School at Louisville, Ky.

The work in both manual training and domestic science at Cincinnati, O., has been carried into the 6th grades, and one more first-year high school branch has been added. The salary schedule has been raised so that the salary of a grade teacher of manual training may go to fifteen hundred dollars and for domestic science to ten hundred and fifty dollars. For this reason there were few changes in the teaching force this year. Miss Thompson of the domestic

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ROOM AT SHREVEPORT, LA., FURNISHED BY PUBLIC SCHOOL STUDENTS IN MANUAL TRAINING AND DOMESTIC ART.

"Color scheme was brown, wood used was oak, stained to fumed oak color. Cushions for chair and settees were done in sheepskin. Lamp, lanterns, hinges and pulls for book case, book supports, etc., were made of copper. Glass in lamp and lanterns was amber apolescent. Curtains and rug were stencilled. The furniture was made by the second year high school class, each boy selecting a piece that he could use at home. All work was done from working drawings prepared by this class. Copper work and electric wiring for lamp and lanterns were done by the fourth year high school class."

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science department was married last June and Louise P. Yale goes to Kansas City, Mo.

The following teachers have accepted positions in Cleveland, O.: James F. Barker formerly director of the Hackley Manual Training School at Muskegon, Mich., is principal of the new technical high school. Ada B. Williams formerly of Pratt Institute is now Supervisor of Domestic Science. Edward A. Hilgen of Indianapolis is to teach manual training in the grades.

L. N. Bryant formerly of Cleveland is now Director of Manual Training at Saginaw, Mich.

Mary A. Wright of Springfield, Ill., is now assisting Miss Goldsmith the Supervisor of Manual Training at Bloomington, Ind.

Five new centers for seventh and eighth grade manual training have been opened in Minneapolis. The following teachers have been added to carry on the work: W. W. Claus formerly director of Manual Training, Dubuque, Iowa; Eugene T. Farley of Austin, Minn.; John B. Corcoran who was teacher of manual training in the Phillipines and later a student at Chicago University; Terence W. Gilbert from Oswego Normal School, Oswego, N. Y.; Floyd W. Ray from Mechanics Institute, Rochester, N. Y.

After you get a new school building, the next thing to do is to refine the influence it has upon the children by adding beautiful pictures and other works of art. Sometimes this is difficult because of lack of funds. The new Webster Manual Training School at Omro, Wis., is showing what can be done without large appropriations where students and teachers work together to raise money.

The Worchester, Mass., Art Museum is opening a School of Design and Metalwork. Katherine B. Child and George J. Hunt are to be instructors, and C. Howard Wolker of Boston is announced as lecturer on design.

The Jacksonville, Ill., schools now have a thrifty department of manual training with headquarters in the high school building.

Eugene C. Graham, formerly instructor in Manual Training at the Central High School, St. Paul, Minn., has been elected director of Manual Training of the public schools of Davenport, Ia.

WASHINGTON.

The growth in manual training the last year in all parts of the State is very encouraging—a growth in extent and interest and a growth in method and matter. The general prosperity everywhere and its favorable reaction on teacher's salaries and the increase of funds available for education, together with a consequent need for better educated men and women, has made manual training possible and attractive, when before it would not have been given a hearing.

The three state normal schools, Ellensberg in the central part, Cheney, ten miles from Spokane, and Bellingham in the extreme northwestern part of the state offered courses in elementary manual training during the past summer.

The State Agricultural College at Pullman, in the southwestern part of the state, (Washington is larger than all the New England states), in the prosperous wheat growing country, has its courses in domestic sciences and arts, and in engineering, and is preparing teachers in manual training through its departments of education. This year a new course is offered to be known as "The

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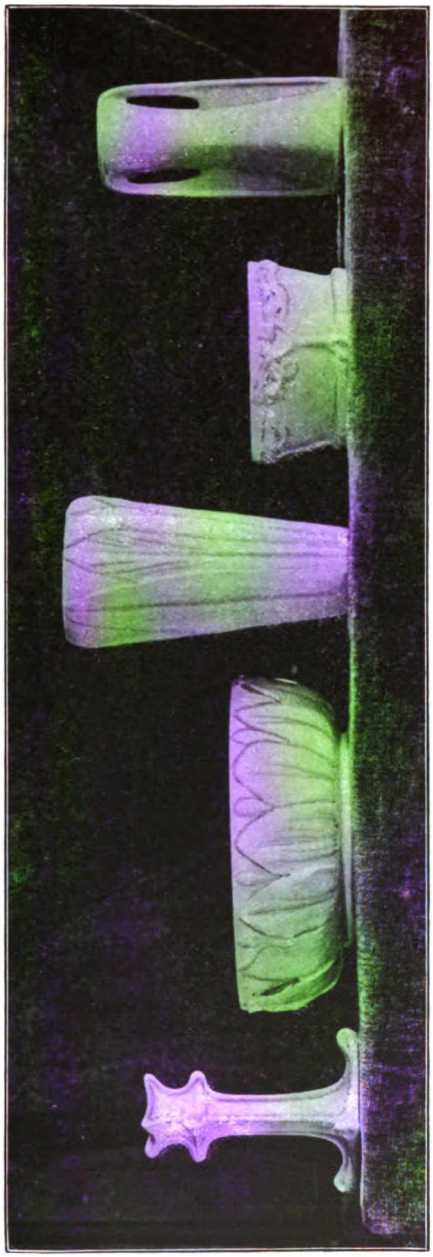

MADE BY STUDENTS IN THE MODELING CLASS OF THE TRENTON SCHOOL OF INDUSTRIAL ART, TRENTON, N. J.

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Department of Elementary Science" intended to deal mainly with the practical application of science and manual training along industrial lines in the years corresponding to the tenth, eleventh and twelfth grades of school work. This three-year course is planned to serve those who cannot or do not desire to go on to college, and who are needed to go back to the farm or shop as intelligent workers, rather than superintendents and engineers.

On the coast, Tacoma has made great advancement in this line. Mr. Whitcomb, has equipped the beautiful new Tacoma High School with a department of manual arts, providing freehand and mechanical drawing rooms, domestic science laboratory, sewing room and two shops for benchwork and wood-turning. Four assistants are under his direction in teaching the three hundred boys and girls who elect this course. Two centers have been provided for the grammer grades boys and girls, the work beginning this fall.

Everett, "the city of smoke stacks", has secured G. B. Hoag of River Falls, Wis., to organize and direct the department of manual training, and Laura A. Stowell of Calumet, Mich., is in charge of the domestic science department. Superintendent Thornberg is beginning the work right by providing for the girls in cooking and sewing as well as the boys in shopwork, and in the grades as well as the high school.

Snohomish, a town of 3,500 population, has made a beginning in a small but vigorous way. Superintendent Hodge, not having funds sufficient in the public treasury, secured help from the business men and began some elementary work in wood for the boys and sewing and cooking for the girls, the latter taught by Mrs. Hodge. He now plans fitting up a building formerly used as a county jail with benches, a motor and lathes for work in the high school, and expects to raise $5,000 in the town by subscriptions, the popularity of the work making such an undertaking possible.

Seattle has grown prodigously, by increase in numbers and by annexations. Four towns or districts contiguous have lately been annexed. Ballard, the largest of these, has 75 teachers, four of which are in the manual training department. To care for the high school enrollment, which now amounts to 2700 pupils, a second new high school has been provided to take care of 1000 pupils. The increase last year was accomodated in the Franklin Annex where a cooking, and a woodworking and drawing room were fitted up, and about 150 of the first-year pupils were provided for in the manual training course. In the grammar grades there are now thirteen centers for the boys and four cooking centers for the girls. This is the first-year cooking has been taught to the eighth grade girls. The new Lincoln high school will provide for only the first two years of the manual-training course, the last two years to be given at the central building. This is done for two reasons: The cost of equipment in the last two years is much more expensive, and the classes are always very small, consequently expensive to teach. These classes can be combined and the equipment and teachers at the central building will be sufficient. It will be easier to offer special trade or industrial courses in these last two years as electives, with teachers capable, and equipment adequate for such work, and at an age in the boys' and girls education when such specialization may be safely begun if conditions require them to make the choice.

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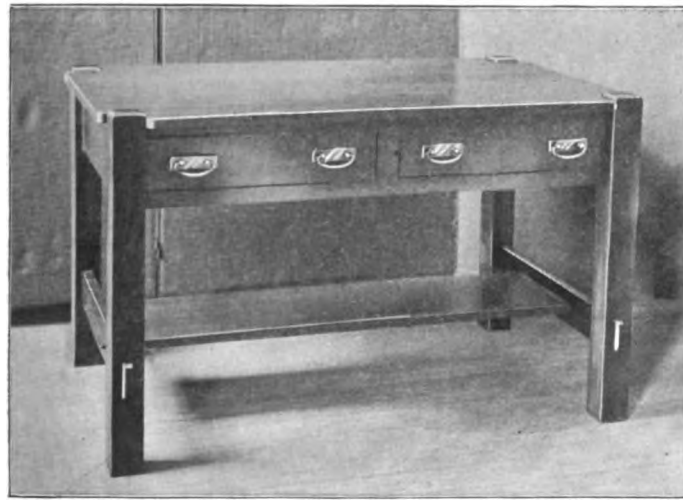

DESIGNED AND MADE BY SUMMER SCHOOL STUDENTS AT BRADLEY POLYTECHNIC INSTITUTE.

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There are now thirty-four special teachers in this department. Lura Beason, formerly of the Hackley Manual Training School, Muskegon, supervises the sewing and cooking, and Clara P. Reynolds, formerly of Great Falls, Montana, and the past year successful teacher of art and design to the girls in the Seattle high school, will assist in the supervision of the manual training for the elementary grades. Miss Agnes Craig leaves the domestic art department of the high school to accept a position in the College of Industrial Arts, Denton, Texas, as head of the Department of Domestic Art, under President Cree T. Work.

A twenty per cent increase in salaries has made it possible to secure better teachers. The future is very bright for constructive educational work in the Northwest.

B. W. JOHNSON.

CALIFORNIA.

There are at present twenty-seven manual training centers in the city of Los Angeles. Manual training is to be introduced into the public schools of Berkeley City this year. Venice is to have a domestic science department.

That the manual training work at Santa Barbara has taken a strong hold upon the community is evidenced by the fact that at a special bond election held recently, a new sloyd building was provided for. This will supplement the equipment of the Blake Memorial Building and will give adequate space for metalworking and domestic science as well as the special work of the normal department. In this connection, it is significant that the state board of public instruction at its meeting in December, 1906, endorsed the normal training of the Anna S. C. Blake Manual Training School and recommended the same to county superintendents, who are permitted to grant special certificates for manual training on a diploma of graduation from this school. This summer Miss Ednah A. Rich, principal of the school, taught one of the courses at the School of Education, University of Chicago and then returned home to conduct her own summer classes, which followed the meeting of the N. E. A.

From a comparatively small beginning, manual training work in the schools of Santa Anna under the direction of Albert M. Shaw has this year been extended so as to give one recitation per week to all boys in the fifth, sixth, seventh, and eighth years of the grammar schools. The girls of the same grades take domestic science at the same time. The work has also been introduced into the high school. A very strong public sentiment has been developed in favor of the work. Bonds have been approved to erect and equip a large new building. Supt. J. A. Cranston is deeply interested in manual training and gives every encouragement for its successful development. The outlook is most promising for a successful future.

Pamona started work in manual training two years ago. An equipment for woodworking costing about $600 has now been provided. Concerning the scope and plan of the work, the director, A. J. Pirdy, recently wrote:

"Woodwork is taught in grades five to eight inclusive. Our course of models is very similar to those of Mr. Larsson, with some changes made necessary by local conditions. All material is furnished by the Board, except where a boy wishes to make something requiring a considerable amount, when the boy is asked to furnish his own material. This is not a fixed regulation and I often

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furnish the material and encourage the making of larger and more useful things for the home, but only after the boy has demonstrated his ability to do good, careful work. I find it a very wholesome incentive for a boy to have a little personal capital involved.

"As to drawings we do about as most manual training teachers—have pupils copy some drawings, make some from the model, and work directly from blue prints. We do very little drawing in the "shop", but try to have the drawing done during the drawing lesson in the grade room. In each grade, however, we have at least two models made from drawings done in the metric system. This is to encourage the use of that practical system and to corroborate the grade work. (The teaching of the metric system is here begun in the 5th grade.)"

Mr. Pirdy subjoins the following: "P. S.—I might add that only boys take woodworking; the girls, cooking and sewing."

The manual training department of the San Diego schools is beginning its twelfth year. The past year has counted for greater progress than any previous year, and this has been greatly stimulated by holding exhibitions of the work from time to time during the past two years and by placing a permanent exhibit in the rooms of the Chamber of Commerce.

The course of study includes paper, cardboard, raffia, etc., in the first five grades, supplemented by the sand table for illustrative work in history and geography. The boys of the sixth, seventh, and eighth grades are given benchwork. The girls are given sewing.

Contemplated changes in the general organization of the school system provide a room in each large building equipped for benchwork and also a room to be devoted to domestic science.

A polytechnic course will be added to the high school curriculum as soon as possible after the completion of the new building now in course of construction. The city has a well-equipped private school for the teaching of pattern-making and foundry practice. Public interest is increasing in the Manual Training School and foundations are being laid for a new demand—the evening trade school. In some quarters this is being talked of now and it is hoped that the establishment of a polytechnic high school will provide the room and teachers for a trade school.

The State Normal School at San Diego has a well-equipped shop in connection with its training school. This is to be enlarged so as to provide for the students in the normal school proper, and a special preparatory course for teachers who contemplate entering the manual training field will be added.

A movement, far reaching and radical in its significance and one that means much in the history of scientific and technical education in the west, is announced from Throop Polytechnic Institute. Throop was founded sixteen years ago and has had a wonderful growth, having at present some six hundred thirty students and comprehending five schools: elementary, commercial, academy, normal and college. The increasing demand on the Coast for well-trained men in engineering lines and the absence in the southwest of any strong college of engineering has led to the establishment of such an institution.

A new site of some 22 acres has been secured and adequate buildings are being planned. In the meantime changes have been effected such as to provide

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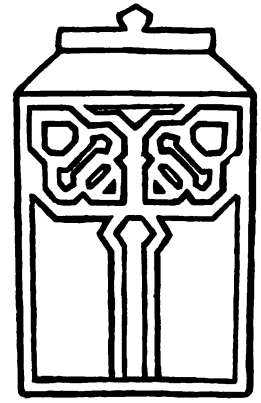
amply for the college during the few months it is to remain in its present quarters. Electrical and mechanical engineering will receive chief attention; and some thousands of dollars are to be spent in equipment and several additional instructors are to be engaged for the coming year.

The academy, and the normal school of art, manual training, domestic science and domestic art are to be strengthened and developed. The commercial school will be merged into the academy, and the elementary school will be given a separate campus with new buildings, and will be affiliated.

Dr. Walter A. Edwards, who for ten years has been at the head of the Institute has severed his connection with the school and will identify himself with the Los Angeles High School as head of the classical department. Prof. Arthur H. Chamberlain who has been identified with Throop for several years has agreed to remain as acting president until a permanent president is installed, and Professor Benjamin F. Stacey, head of the department of history and economics is acting dean.

"The Board of Trustees", says President Chamberlain, "are a unit in declaring for college extension. We have a superb site such as shall meet the demand for years to come. The plan proposed means buildings adapted to our needs; it means an increased and strengthened faculty, and already we have forty of as well trained men and women as can be found in any institution of like character in the country; it means money, and we have assurances of increased endowment. But the thing of chief significance is the fact that the Institute is to be put upon the plane of the best engineering colleges in the country."



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REVIEWS

History of the Pestalozzian Movement in the United States. By Will S. Monroe. C. W. Bardeen, Syracuse, N. Y., 1907, 8 x 6-in., pp. 224.

To most teachers who have studied text-books on the history of education written five or more years ago the name of Pestalozzi stands merely as one of the list of European reformers, which includes Comenius, Rousseau and Froebel. It suggests a life of visions and sacrifice in the cause of humanity but seems very remote in time and place. Professor Monroe's book changes all this; it makes a vital bond of connection between Pestalozzi and the best educational development in our own country and time. And the teacher of manual arts is especiallv interested in this volume because it covers the germinal period of the manual trainin~ idea.

But more than that, a pleasant touch of romance is given to the record of one's pedagogical ancestry by getting acquainted with William McClure at New Harmony, Joseph Neef and "Neef boys from the Falls" of the Schuylkill, Bronson Alcott and his negro pupil in Boston, or even Edward A. Sheldon and his "ragged school" in Oswego. When one thinks what has come down from these men he is almost ready to say, Blessed is the man who is enough of an idealist to become a practical failure. However, this is not a fair inference from the book, for it also presents the work of such strong, practical men as Henry Barnard, Lowell Mason and William T. Harris, who caught and utilized and handed down to us somewhat of the spirit of the earlier men and made the teachings of Pestalozzi a vital force in American education.

When one has finished reading the book his only criticism is that the author didn't tell him all he wants to know about the subject—he wishes some of the chapters had been three or four times as long—but this is the same as saying that the author has accomplished his purpose and all the reader has to do is to search out and read the books given in the very complete bibliography at the end of the volume. —*B*

Sloyd for the Three Upper Grammar Grades, by Gustaf Larsson. George H. Ellis & Co., Boston, 1907. 7 x 10-in., pp. 60; price, teachers' edition, $1.25.

This book consists of fifteen introductory pages—including definitions, general principles, conventions used in drawing, fundamental steps in whittling, sawing, planing, boring and chiseling—ten plates of working drawings for seventh grade, nine for eighth grade and thirteen for ninth grade. To these are added photographs of models and notes on equipments. With the plates for each year is given a synopsis showing the progression and variety of models, exercises, tools and wood. The book is essentially a collection of working drawings, and as such will be heartily welcomed by teachers of grammar-grade woodworking everywhere. It contains many of the time-honored sloyd models, such as the wedge, shrub-label, penholder, tool-rack, bread-board, and coat hanger, but it also contains many new ones, such as the ironing stand, window stick, book shelves and other small pieces of furniture.

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A welcome feature is the attention given to supplementary or optional models and to the encouragement of individual thought on the part of pupils in designing or suiting the model to his own use. This and other progressive features of the book prove that there is no marked difference between the best American sloyd and the best Amerjcan manual training for the grammar grades. Indeed, they are one and the same thing, and most teachers who call their work manual training will find little to criticise in this book except Mr. Larsson's discussion of the term manual training. In this he forgets that the use of a word determines its meaning and that to one generation a word may have a much broader significance than to the previous one.

A feature of the book that will attract attention is the recommendation that the metric system be used in a part of the models of the ninth grade. Most of the drawings for this grade are figured in both the English and the metric systems.

A pupil's edition consisting of the plates printed on heavy grey paper with holes punched in one end for binding is sold at 50 cents each. —*B*

The Woodwork Scholar's Guide in the Use of Tools. By C. W. D. Boxall. Published by O. Newman & Co., London, 1903. 12 x 8-in., pp. 38; illustrated.

"In presenting this little work to the manual training world, the author hopes that the accompanying notes and sketches will be found useful as an adjunct to the practical demonstration of instructors."—Preface.

This book consists of twenty-nine plates, each plate consisting of notes on some particular tool or tool process, fully illustrated by crayon sketches. In addition to these plates there are notes on the structure of tools, structure and growth of trees, on timber, and the seasoning of timber, and on the classification of exogenous trees.

The drawings illustrate quite well the different operations and the directions are concise and to the point.

The author is to be commended for having described the tool processes without reference to any particular set of models. He seems to have realized what most American writers of books on woodwork have not, that one's models as a whole are interesting to one's self alone, while the interest in tools and tool processes is universal among craftsmen.

With additional plates, illustrating and directions for making the joints most commonly used, we should have a book that any teacher of woodwork could use to advantage with his classes.

It is rather unfortunate, however, that the planes described are the old wooden ones of our grandfathers, that the claw-hammer is replaced by one more suitable for metal work—one which necessitates the use of pincers in withdrawing nails. The center-bit, too, which receives a whole plate is hardly worth so much attention in view of its being so little used now-a-days.

As a whole, the subject matter is well presented and the book is in the right direction. IRA S. GRIFFITH, Oak Park, Ill.

Lehrgang fur Modellieren. By Otto Mayer. Frankenstein & Wagner, Leipzig, 1907. 9¼ x 6½-in., 24 plates and 14 pages of text; price 2 Mk.

This grade course in clay-modeling seems very strange to an American teacher who is inspired with our present ideals in art education. He may approve of much of the technique, but he cannot understand why realistic serpents

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and birds' nests should be the decorative motifs for candlesticks and matchsafes. He may agree that modeling a beetle on a lilac leaf or a worm on a plantin may be a help in nature study, but when the lizard and the ivy vine are made to twine over and around the stump of a tree and the whole cut off horizontally and gouged out to make a recepticle for matches or pins the effect is far from satisfactory, from the American standpoint. To be sure it combines nature study and modeling into a so-called useful article, but in this case we prefer less correlation and more freedom. Not all of the models are subject to this criticism—indeed some of them are excellent, especially some of the examples of plant forms, but even in these we miss the study of plant structure which leads to the type of design which is approved not only in America but in the best German decorative art. From our standpoint the course is narrow and lacks freedom of handling. —*B*

Art Education Drawing Book Course. Books 1 to 8 inclusive. Prang Educational Co., Chicago. Books 1, 2 and 3, size 9½ x 6½-in., pp. 44, price 15 cents each. Books 4, 5, 6, 7, 8, size 8½ x 11½-in., pp. 40, price 20 cents each.

This is a new series of books which has only recently come from the press. The greater part of the material and the plan have been taken from the "Text Books of Art Education," and the same subject order has been closely followed. The distinctive difference is not one of plan or of subject matter or of aim, but of form. Unlike the "Text Books of Art Education" the pages of the Art Education Drawing Books may be used for drawing, the right-hand page in each book of the series being left blank and the left hand page containing suggestive illustrations and very full directions for both pupil and teacher for working out the lesson. The page arrangement is such that the right hand page may be used directly for pencil or water color drawing, or it may be used for mounting drawings done on other paper, or certain kinds of constructive work in the flat, thereby making it a record book in which to preserve the best effort of the pupil.

In addition to the directions on the illustrated left-hand pages relating definitely to particular lessons, the inside of covers contain general directions pertaining to methods and materials, and very helpful suggestions for color work which the books provide to an extent, color pages being bound in the front and back of each book. A Glossary of Terms peculiar to the subject is printed in each drawing book for the convenient reference of both teacher and pupil.

The sequence of subjects is the same as in the "Text Books," namely:

I. Out of Doors. II. Growth, Blossom, Fruit. III. Life and Action. IV. Beauty in Common Things. V. Apparent Direction of Edges and Outlines. VI. Measuring and Planning. VII. Design.

Broad in scope, rich in suggestion and examples of the best technique, yet definite enough to be practical, these books ought to be especially suited to the needs of schools without a trained supervisor of drawing.

First Steps in Mental Growth. By David R. Major. The Macmillan Company, New York, 1906. 7½ x 5¼-in., pp. 360.

This volume is based upon a record which the author kept of his own child from birth to the end of the third year. These records were not merely in the form of notes, for many photographs of the child and drawings made by the

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child were added. This accounts for the fact that the book contains ten pages of illustrations.

The aim of the book is to present data, both observational and experimental, bearing upon certain aspects of infant mind which seem to the author to be fundamental to later mental development. The scope of the book is suggested by the following chapter headings: Hand and arm movements, drawing, feelings and their expression, development of imitation, color, number, form, association, memory, imagination, play, pictures, behavior of the child before his image, language.

Dr. Major's observations concerning form study, drawing, color and pictures will be especially interesting to teachers of drawing. —*B*

Course of Study for the Common Schools of Illinois. Revised by the standing committee of the county superintendent's section of the State Teachers' Association. Published by C. M. Parker, Taylorville, Ill., 1907; price 30 cents.

This represents the work of many people. The outline in drawing was prepared by E. J. Lake of the University of Illinois, in household arts by Miss Isabel Bevier, also of the University, the elementary constructive work by Edward F. Worst of the Chicago Normal School, and the woodworking by a committee consisting of Charles A. Bennett, Bradley Poyltechnic Institute, L. H. Burch, Western Illinois Normal School, William T. Bawden, Illinois State Normal University, Ira S. Griffith, Oak Park, and Seymour L. Smith, Northern Illinois State Normal School.

Selected Bibliography on Industrial Education. Bulletin No. 2 of the National Society for the Promotion of Industrial Education. By Charles R. Richards, pp. 32.

This bibliography has been compiled in response to many inquiries, and gives references to the most important statistics, books and articles bearing on the questions of vital interest in the present discussion of industrial education. Its convenient arrangement by subjects and the extensive notes under the several titles listed make it especially valuable. Copies may be obtained by addressing the secretary of the Society, Prof. Charles R. Richards, Teachers College, New York City.

The following have been received:

Primary Hand Work. By Wilhelmina Seegmiller. Atkinson, Mentzer & Grover, Chicago, 1906. 7¼ x 5-in., pp., 136.

This attractive little handbook is the result of a revision of "Suggestions in Hand Work" by the same author. The later book, however, is more comprehensive and is rearranged so as to present a graded courses for the first years of school life.

Manual Arts Number of the Educational Bi-Monthly. June, 1907. Published by the Chicago Normal School.

This contains a dozen articles on the various phases of the manual arts. Among them are "Vocational Values in Elementary Manual Training" by Ernest B. Kent, "Work in Textiles" by Edward F. Worst, "How Curricula in the manual arts might be planned in Outline" by Frank M. McMurray and Oscar L. McMurray.

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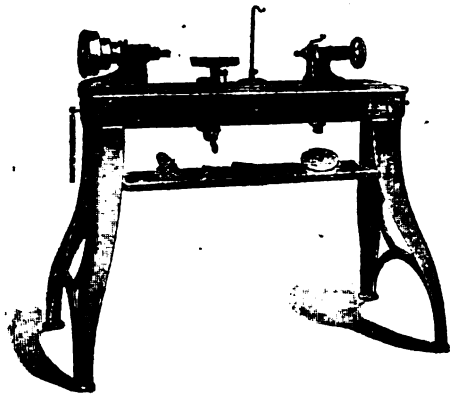

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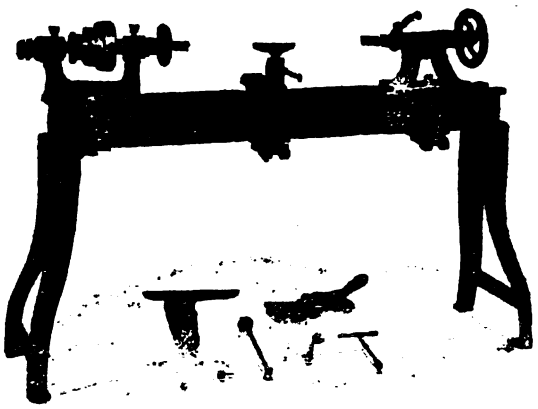

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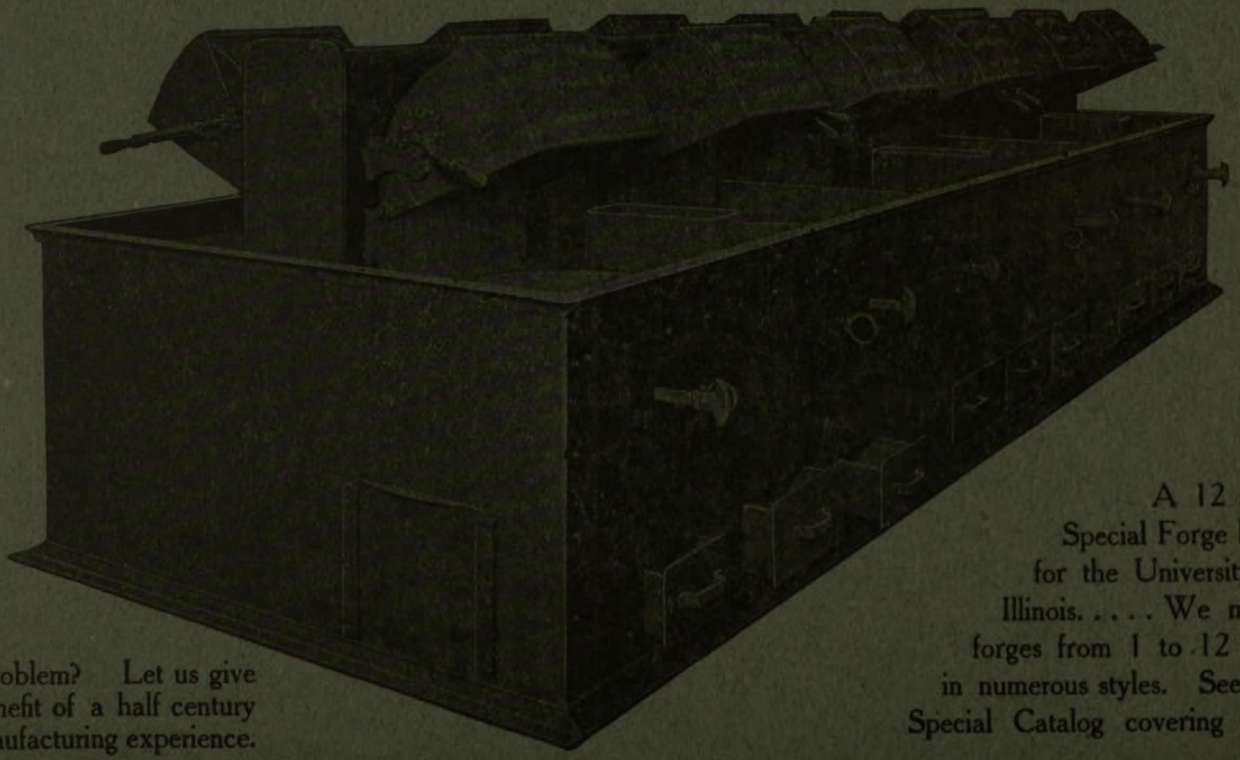

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Vol. IX DECEMBER, 1907 No.

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Future Articles

Among the good things promised for the near future are the following:—

"The Decorative Aspects of Plant Forms", by *Dr. James P. Haney,* director of manual arts, public schools, New York City. We are sure that every teacher who has read Dr. Haney's two series of articles already published in this magazine, and his contributions to the year-book of the Council of Supervisors will welcome this announcement. The article will be illustrated with a half-dozen or more plates of selected floral forms.

"Manual Training in New Zealand", by *G. George,* director of technical education in New Zealand and vice-president of the National Association of Manual Training Teachers of England.

"Drawing Room Equipment for Technical High Schools", an illustrated article by *Frank E. Matthewson,* head instructor in drawing, Technical High School, Springfield, Mass., and president of the Council of Supervisors of the Manual Arts.

"Manual Training at Hampton Institute and its Relation to the Trades", by *John H. Jinks,* director of manual training, Hampton Institute. This article will be illustrated by several excellent photographs.

"Planning a Manual Training High School", by *Fred D. Crawshaw,* principal of Franklin School, Peoria, Ill. A helpful discussion illustrated with floor plans of three typical American manual training high school buildings.

"The Place of Manual Training in the Elementary School", by *Edwin L. Taylor,* director of manual training at the State Normal School, Plattsburg, N. Y.

"Interest Aids in the Grade Shop", by *Louis C. Butler,* Eads Avenue Training School, St. Louis, Mo.

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CONTRIBUTORS TO THIS NUMBER

WILLIAM HAWLEY SMITH—Born in Sunderland, Massachusetts. Spent all his early life on a farm. At sixteen he began to teach school in Christian County, Illinois. A little later he went to the Illinois State Normal University where he graduated in the high school department in 1870. Once, when asked where he received his college education, Mr. Smith replied that he inherited that from his father who was a graduate of Amherst. After leaving Normal he taught four years and later was superintendent of the schools of McLean County for eight years. Then for five years he was in the newspaper business in Peoria, a part of the time doing editorial work. It was during this period, in 1882, that he wrote his "Evolution of Dodd," the sale of which has already passed the half-million mark. After leaving newspaper work Mr. Smith was in the manufacturing business for several years until in 1894 when he began to travel with Bill Nye. He was with Nye for one hundred performances, furnishing half of each program. Since that time he has remained on the lecture platform where he now occupies a unique position. He has a host of friends in a dozen states. Whatever the role he plays—humorist, story-teller, reader, lecturer, or author, he is always fundamentally a teacher. His "Walks and Talks with Teachers" was published in 1893, and a little later he wrote "An Interview with the Shade of Socrates" which appeared in the Educational Review. His "New Hamlet," in true Shakspeare-Smith style, was written in 1902 and "The Promotors" in 1905. Concerning the latter Dr. Edward Everett Hale wrote, "You have written my novel, which, alas, is still in the inkstand. When I get it out of the bottle in 1915 I shall be glad if people say it is as good as "The Promotors."

FRANK A. MANNY—Born in Brown County, Illinois. Early education in public and private schools, mostly in Michigan City, Indiana. He received the A. B. degree at the University of Michigan in 1893 and the A. M. degree in 1896, since which time he has done post-graduate work at the University of Chicago and at Columbia. At one time and another Mr. Manny has had considerable experience in stores, Western Union messenger service, as bookkeeper and railway employee. His first teaching experience was when he was sixteen years of age in a country school of 51 pupils. Before leaving college he had some further teaching experience in evening classes and in tutoring. Later he was principal of the Moline, Illinois, high school; assistant in the department of pedagogy at the University of Chicago; district supervising principal in Indianapolis; director of observation and methods in the State Normal school at Oshkosh, Wis.; and superintendent of the Ethical Culture School, New York City. He is now taking two years for study—one year in Europe and one in America. His central interest is in the problem of productive labor as a factor in education.

CHARLES H. BAILEY.—Born in Iowa City, Ia. Graduated from the Iowa City high school and then from the Iowa State University, receiving the B. S. degree in civil engineering. For two years he was employed as inspector and superintendent of water works construction. Spent summer of 1897 at Cook County Normal School, taking special work in manual training. Taught manual training five years in public schools of Iowa City. Attended Teachers College, Columbia University, receiving degree of B. S. and the manual training diploma in 1903. He was director of manual training at James Millikin University, Decatur, Ill., for two years, since which time he has been in charge of the department of manual training at the State Normal School, Cedar Falls, Ia.

CHESHIRE L. BOONE—Born in Henry Co., Indiana. Early education in the public schools of Frankfort and Bloomington, Indiana, and later in the State Normal School, Ypsilanti, Michigan, and the University of Michigan. Then for two years he was an architectural draughtsman in Detroit. Turning again toward teaching, he went to Teachers College, New York City, where he received a diploma in 1900. In September of the same year he began teaching clay modeling in the public schools of Montclair, N. J. Since that time he has been promoted until now he is director of art and handwork for the schools of the entire city. Four years ago he took the summer course in pottery at the New York State School of Clay-working and Ceramics at Alfred, N. Y. and has since given much attention to this subject. For two years he taught the summer school class in pottery at Teachers College, and last summer he taught both pottery and manual training for elementary schools at Bradley Polytechnic Institute. Mr. Boone is a memeber of the Council of Supervisors, president of the New York School Crafts Club, and treasurer of the American Committee of the Third International Congress for the Advancement of Drawing and Art Teaching. At the present time he is much interested in the organization of courses in drawing and handwork for rural schools of the State of New Jersey.

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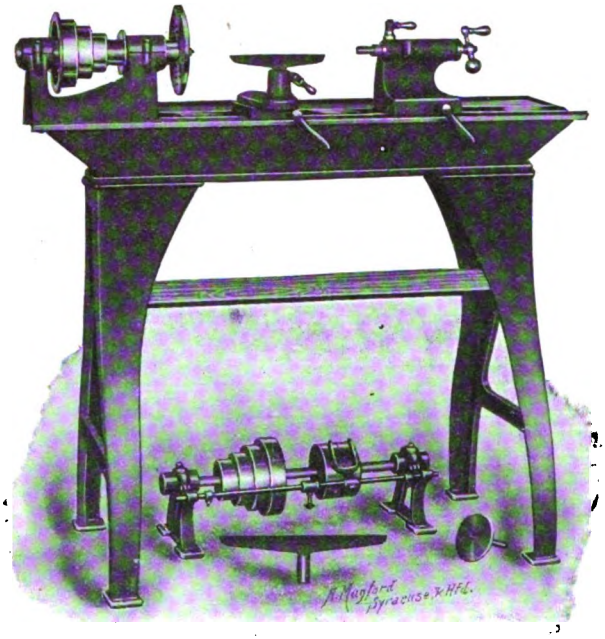

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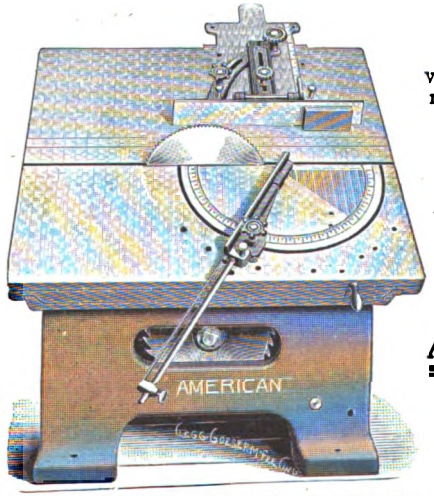

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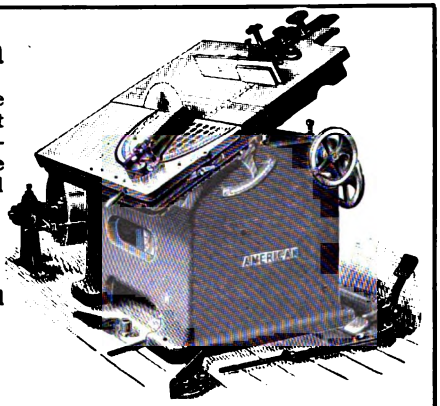

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VOLUME IX NUMBER 2

CAMBRIDGE, MASS.

MANUAL TRAINING MAGAZINE

DECEMBER, 1907

FOR PIONEERS.

WILLIAM HAWLEY SMITH.

IN the early stages of the establishment of any new enterprise, the cause is liable to suffer as much or more from the ignorance, the mistakes and the ill-directed zeal of some of its supporters as from the criticisms, the complaints and even the howls of its enemies of various degrees of intensity. No one is to blame for this condition of affairs. It is one of the unavoidable items that always obtain in such a situation.

And because these things are so, it is the part of wisdom for those who head any new procession to "go slo", as dear old Josh Billings used to say, and not to be too eager or too anxious to go "fast and far in a day." It is all right, and just as it ought to be, to pull the throttle wide open when one is running a "limited" over a well-ballasted and thoroughly settled road-bed, on schedule time and under a block system; but to try to make the same speed with the same locomotive over a line that, as a matter of fact, has as yet only a few ties and rails laid here and there, while, for the most part neither the direction nor the terminus of the main track has been fully determined, much less mapped out and thoroughly surveyed, I say, to try to "speed" under such circumstances is to invite trouble, to say the least, and would be very apt to result in wrecks many, costly, and generally disastrous and expensive.

And it seems to me that this condition obtains very largely in the status of manual training and domestic economy courses of study and methods of instruction, as these are at present conditioned.

As I have said, no one is to blame for this, but the facts remain; and because they do, they demand a conservatism and caution on the part of all parties concerned, that will be salutary—that will save the cause from set-backs many and serious, and from absolute wreckage in not a

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few cases. I make this statement after visiting a considerable number of schools of this kind, in different sections of the country, and from personally observing the work done and attempted to be done in them.

This phase of the situation was first brought forcibly to my notice as I was inspecting a manual training school in one of the foremost cities of the West. I was accompanied by the City Superintendent of Schools, one of the wisest and ablest in this or any other country, a man who had had more than a quarter of a century's experience in his chosen profession and whose success had been phenominal from the first. The city had furnished a fine building for this department of school work, and it was well outfitted with tools and machinery. And yet—

We went into a room where a class of boys and girls was at work under the instruction of a teacher who was supposed to be able to do well the teaching that was required. But a most cursory glance at what was doing showed that both in matter and method the work was far from what the necessities of the situation required. We looked on for a few minutes, and then the Superintendent whispered to me, "Come away." And we came away.

As we went down the hall, going towards another room, the Superintendent said: "What you have just seen is a fair sample of what manual training has to go up against in these days of its beginning, and will have to, for a good while yet. The fact is, everything about the business is so new and untried that no one knows what is best to be done, or how to do it! I don't know either of these things myself, for I have had no experience in the premises to guide me, and I can't find anyone who can tell me, with any degree of certainty, what I want to know—what I ought to know to make a success of the work. When we started in, I went to a university and got the most promising young man they had in stock, and put him in charge of the plant and its curricula; but he broke down inside of six months. He had theories to burn, but when it came to practice, he was powerless. He couldn't use tools to amount to anything; that is, he personally had no technical skill regarding the things he undertook to teach. The result was that he could not furnish his pupils any ideals to work up to—he botched the things he tried to make, and his pupils did as he did. What else could be expected?

"That was the record for our first season," he continued. "I let this man go at the end of his year, and in his place I got a practical mechanic, a man who had technical skill in his own right, and who could make things and make them thoroughly. But he had no knowledge of teach-

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ing, had no idea as to how to impart what he knew so well—the boys ran over him, and I had to let him go at the end of his first term! It was a black eye for us, but we lived through it, somehow, and kept going in spite of these drawbacks. Now I have at the head of the school a young man that I have largely raised myself, so far as his education is concerned, and we are working things out as well as we can. But the trouble still is, to get efficient teachers for the work we want done—and, worse than that, to find out what we really ought to do."

Now this was an honest confession, and my notion is that it voices the experience of all equally honest superintendents, all over the country. All we can do about it is to do as this man was doing and still continues to do, namely, "cut and try," and feel our way along, to the best of our ability. Only that way can salvation lie, only so can success be attained.

And I regret to say that there are superintendents and instructors not a few who are unwilling or unable to work by this common sense and sane method. I do not blame them so much, but I trust I may be excused if I note a few of the ways in which, it seems to me, some of these have gone wrong, and so have harmed the cause they stand for.

The commonest fault I have noticed is the demand of many instructors for too complete and expensive an outfit to start in with. The error is a most natural one, and for this reason: Most of these men and women have received their training in schools which are furnished with the most perfect equipments and appliances that money can buy or the market affords. They have learned to do things with the help of all these clever and exceedingly handy tools and machines, and it is but natural that they should wish for their likes when they set up teaching on their own hook.

Thus, if a teacher has been educated in a woodworking shop where there was a first-class band-saw, which was always ready when he wanted to rip a board, it is but natural that he should wish for its duplicate whenever he has a board to rip. So he demands a band-saw as a part of his outfit. Indeed, I have seen more than one case where this method of ripping a board was the only one that the instructor was master of! That was the only way he had ever done such work!

But the fact is, that a band-saw is a luxury rather than a necessity for the great mass of the rank and file of the wood-working fraternity, outside of large manufacturing establishments. It is the plain, muscle-driven rip-saw that has to do this work, for the bulk of wood-workers. Yet I have seen more than one manual training teacher who could not

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use this most common and most necessary tool with accuracy and dispatch, and who, for this reason, has demanded an expensive band-saw as a part of his outfit. This is only a single instance of what stands for a very common fault—a fault that has done much to harm the cause that needs help rather than hindering.

Thus, in a town of moderate size, a generous-minded man gave a thousand dollars to start a course of manual training in their public schools. The Superintendent, the directors and all the people of the town were enthusiastic over the gift, and those in charge of it went to work, to realize the best returns that could be had out of it. They went to a university and got a graduate to undertake the management of the business, the Board employing him for a year, at a fair salary, which was paid out of the public fund.

But now, see! The young man began by declaring that a thousand dollars was no fit amount of money with which to equip a manual training school! He spent that sum in a twinkling, and called for more so earnestly that the original donor doubled his subscription, and all of the increment went the way of its predecessor. The most perfect and expensive machines and tools were bought, regardless of anything except what the instructor felt that he needed. The result was, that the burden became too great for its promoters to carry, and after a year of experiment the whole attempt was abandoned. All of which was a great pity, to say the least.

On the other hand, I have seen manual training instructors who were doing most successful work without a single machine except such as they have made themselves. They have begun their work "most any old way", with whatever tools they could get together "by hook or crook." And I have seen such schools winning out royally. If they needed something that they hadn't the money to buy, they made it themselves, as best they could. Crude, indeed, in a way, some of these home-made machines have been, but that is only a part of the story, and a small part at that. They did the work, but they did more than that. Some one has said that any fool can work with tools, but it takes a wise man to work without them. There is a deal of wisdom in the remark, and it is in line with what I am trying to say. I used to read some verses, in an old reader, about the Yankee boy and his pocket knife, in which there was a line, the sense of which was that the young scion not only "could make the machine, but could make the machine that made it." That's the idea, and its like should be basic in all manual training work.

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And so I say, buy the best tools and machines, if you can get the money to do so without ruining the cause you are trying to set up. But if you cannot get what you want in this way, take what you can get to start on, and with these for a beginning, go on from grace to grace.

In a similar way, I have seen teachers of domestic science make the mistake of having all their cooking done by gas—not a coal or wood stove in the whole establishment. This is a common fault of training schools for such teachers. Most of these schools are in cities or towns where gas can be had, and so their schoolrooms are fitted up with gas stoves. But the fact is that many of these teachers will be called on to teach in towns where gas cannot be had, and to teach pupils who will have to cook with wood or coal at home. The consequence is that needs and training fail to match in such case, and failure is the result. Half the success in cooking by coal or wood lies in knowing how to make a fire and keep it right! And yet I have seen scores of teachers of cooking who couldn't make a coal or wood fire and keep it right, to save their blessed souls. My notion is that training schools for teachers of cooking should, for the most part, be equipped with wood or coal cooking-stoves, and that teachers should have special drill in making and running a fire right.

Again, don't promise too much as to the results that will come from the introduction of manual training and domestic economy work in a school. These factors will not bring the millenium in a few minutes, or years; and it is folly for teachers to talk to their patrons as if they expected such returns. Always remember that any innovation must make its way among the rank and file with "exceeding slowness" as the river Arar ran, and that a boom is very apt to "bust" when the reaction sets in. And it will set in; it always does. Booms are merely temporary spurts, and their "bust" is always on the margin. So it is a mistake to raise the expectations of patrons or pupils too high, or to make them too intense in these particulars. Say that this work will help, that it will keep a lot of boys and girls in school that could not be kept there otherwise, and that it is a good thing to try, anyhow. Say this, and prove your words true by your deeds; by what you can "show down." So shall your reward be great all along the line. But if you promise more than you can perform, raise hopes that cannot be realized, you will harm more than you help the cause you are laboring to forward. Be earnest, be enthusiastic, if you will, but "don't slop over."

Again, beware of making fixed courses of study, in either manual

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training or domestic economy, and requiring all pupils to take the same, whether or not. This way ruin lies, and that right soon. There are girls who can never be taught to cook or sew, to amount to much of anything; there are boys who can never learn to drive a tack into a two inch oak plank without splitting the plank! (I speak practically within bounds, even if metaphorically, as every honest and common-sense teacher knows). And because these things are so, it is contrary to the best interests of this cause, at this stage of the game, to try to force uniform work upon all the pupils, regardless. I have seen many a back-set for the good work which had its roots grounded in this very common error. A plentiful supply of pupils can be had by taking those who have heads, hearts and hands for this sort of work, and if we will take these, who love what they do, and make the most of them—bring them to the highest grade of efficiency, we shall help the work as nothing else can. Then men will see our good works, and glorify the cause we stand for.

It is an ungracious task to criticise, and I have done little else in what I have written. Some other day I will try to say some things that are more definitely constructive, but this must do for now. Danger signals must be set, especially on all partly constructed and newly made roads, and I have hung up a few herewith that I hope may keep some, at least, from getting stuck, breaking down, and going to smash in any of several ways. The cause I am writing about is, beyond doubt, the greatest in the modern educational movement, and those in charge of it ought to be wise to the limit, to save it from halts and hindrances.

President Roosevelt, in his Keokuk, Ia., speech, which he made as I write, paid a grander tribute to industrial education than to any other form of mental, moral and spiritual training. In doing this, he simply voiced what multitudes of people are coming to see is true. With his far-seeing eye, and his intuitive ability to pick up things that are in the air, he told his audience of the greatest thing that is to happen in the immediate future in the educational world. Let the pioneers in the cause he so ably set forth see to it that they make as few mistakes as possible in furthering the design that he so graphically outlined.

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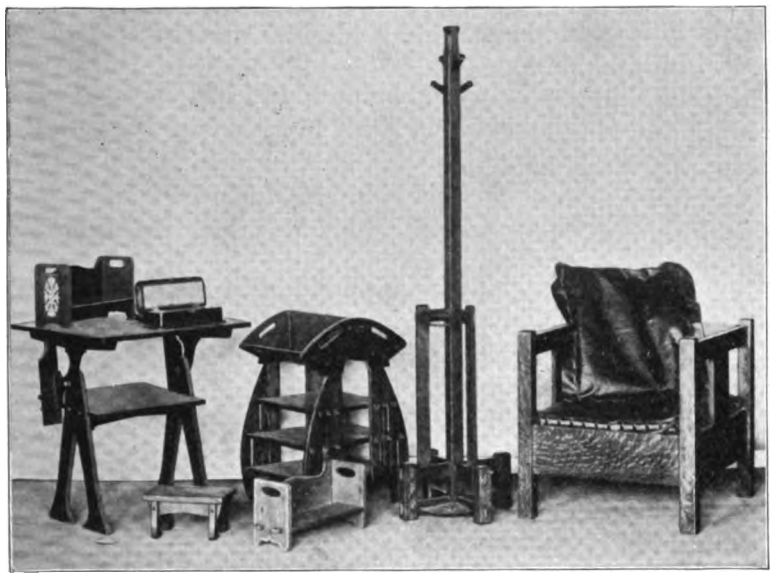

THE ORGANIZATION OF MANUAL TRAINING IN THE HIGH SCHOOL.—II.

GILBERT B. MORRISON.

A COMPLETE history of education would reveal the interesting fact that every subject of study which has found a permanent place in the schools has had what may be termed its academic period—a period in which its right to a place in the curriculum has been defended on purely educational grounds as distinguished from practical or utilitarian considerations. It is also interesting to note that this period followed the period of its introduction, which was purely utilitarian in its aims.

It will be the purpose of this article to distinguish between the *aim* of manual training wherein its objects have enough in common to be considered singly, conceived under the general term "culture," and the *aims* of manual training which are expressive of the more specific motives of different persons when they elect the work for practical or utilitarian purposes. I also desire at this time to give special emphasis to the importance of *skill* as an ideal to be held constantly in mind during the

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teaching process. I shall do this in the light of other subjects whose aims and purposes have been dominated by the same laws and principles of selection.

In Milton's time Latin was studied because it formed the common vehicle of thought. It found its place in the curriculum of the schools of that time, not because it was supposed to have disciplinary value, but because it had practical value; its aim was utilitarian. The first type of high school in this country—the academy of colonial days—was intended for boys who expected to go to college and prepare for one of the "learned professions", particularly the ministry. Greek and Latin were considered indispensable to these professions, and because of their usefulness to these callings they were placed in the curriculum of studies. The pedagogical literature of those days contains no argument for the "culture value" of these studies. Thus the study of these languages had many aims. In the 16th century Latin was the common vehicle of learning; its aim was in pursuit of that learning. In colonial times it formed a considerable part of theological literature and church doctrine; and one of its aims was in pursuit of this literature and this doctrine. It had many aims and they were all utilitarian in character. It was not until the various branches of science knocked at the door of the curriculum that the culture value of Latin and Greek found expression. While the culture value of these languages must have been greatest while they were a part of daily experience, the culture motive did not appear till after they had ceased to be to some extent a part of this experience. In coming down to the present time while this experience has narrowed, the study of Latin and Green still has certain definite aims. The scientist studies them for their derivative uses; the medical student for their employment in medical literature and the writing of prescriptions; the pharmacist for their terminological uses. The philologist studies them for that linguistic comparison which forms the major part of his actual work. It will be observed that wherever the leading purpose is utilitarian there will be found various *aims* of language study; it is only when the purpose becomes purely academic that we find the *aim* of these studies, and that aim is *culture*. This culture aim was the conception of school men whose main purpose has been the establishment of systems of education which would be permanent and complete as ends in themselves.

Another illustration of this tendency may be found in the study of mathematics. Algebra in its primitive stages was used by the Arabs

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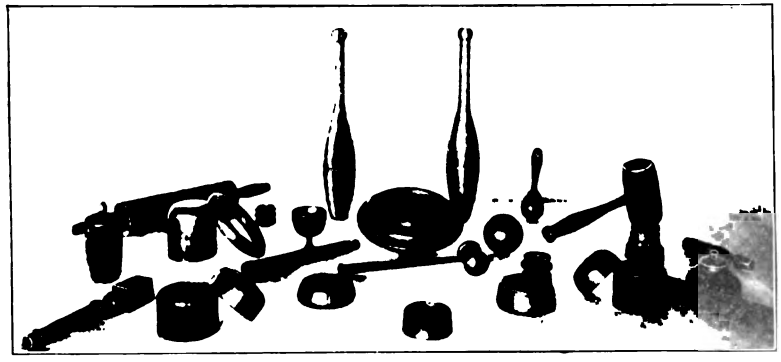
in supplementing and equalizing in the transposition or exchange of terms in what we call the equation. It was a practical art, and probably first had its use in some kind of exchange or barter.

Geometry according to Herodotus, the earliest authority on this subject, had its origin in the necessity of measuring lands in Egypt for the purposes of taxation. First followed as a practical art, it afterward became a deductive science. Both algebra and geometry started as arts with purely practical aims. In our own time these branches are still



WOOD-TURNING EXERCISES.

pursued with practical aims by the industrial and engineering classes who use them in the measurement of quantity. Their aims are as numerous as the occupations employing them. Between these ancient and modern aims—these widely separated continents of human experience—we find the broad, open sea of mathematical scholastics, abstract in their nature and purposes and single in *aim*. And again that aim is *culture*. Again this culture value will not be denied, and it is probably greatest where there has been the least claim made for it—in the practical experiences of life.

The culture value of these studies which are not put to actual use in practical application is really a matter of opinion and, of course, is not susceptible either of proof or disproof.

Remembering that a great deal passes for culture which is not such, and that the primitive instincts of the laity exhibit little longing for it in the abstract; and also noting that social conditions in advanced stages seem to have evolved the notion of special studies for special purposes, it may be wholesome for us teachers to inquire a little more closely than

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has been our habit into the real nature of this culture, and try to find the vital element. Teachers will be loth to abandon their cherished idol. If we still believe that the culture idea is not mere sentiment, we must find and name its true essence. In doing this we may find an important principle which may aid us in interpreting some of the claims made for manual training in so far as these claims are for its culture merely as such.

Now I think it will have to be admitted that this element, this name, this essence is best expressed in the word *skill*. In order that there may be no possibility of a misinterpretation of the word, I shall give the defin-

CASTINGS.

ition in Webster's Dictionary, which expresses the exact meaning that I attach to it, in order that what I shall say may be perfectly clear:— "Skill is the familiar knowledge of any art or science united with readiness and dexterity in execution or performance, or in the application of the art or science to practical purposes; power to discern and execute; ability to perceive and perform; expertness; aptitude; as, the *skill* of a mathematician, physician, surgeon, mechanic, etc." and we may add, reading or translating a foreign language, teaching, playing games, as football, baseball, tennis, chess, etc., etc.

Wherein lies the efficiency of the teacher of Latin? Evidently in his skill in assisting and stimulating the pupil to the acquisition of knowledge and skill in perceiving and performing the many inflectional, syntactic operations in reading and translating. Incidentally the efficient teacher adds interest to the study by frequent reference to its derivation, its relation to other languages, and to the history of the people who used it, but no one will deny that were it not for the skill acquired in handling the forms, the power in translating, the thing would not be worth talking about as a branch of study. The pupil would be marked

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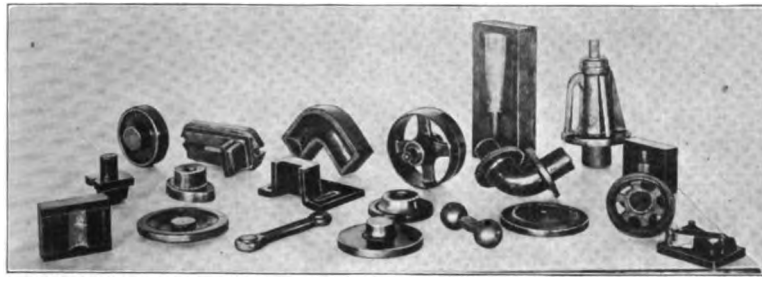
zero; and the teacher would be counted a failure. The culture lies in the skill, both on the part of the teacher imparting, and on the part of the pupil acquiring. It is this skill and this skill only which will enable the pupils later to enjoy the literature, the art and the history which are revealed through the language.

Wherein lies the efficiency in teaching mathematics and the culture of learning it? Is it in the knowledge which comes from the history of mathematics, its relation to other subjects, or its sociological import as applied to the arts of life? This broad view of the value and meaning



PATTERNS.

of mathematics is interesting, necessary, and will come incidentally to the student who can use and apply the science; but the world will never ask the student, "By what method did you study mathematics?" or "what is the sociological import of mathematics?", but rather, "Do you know mathematics, and can you apply them to this or that occupation"? The culture, of course, comes with the skill, with the power to solve problems with accuracy and dispatch; and the skill of the teacher in aiding the pupil in this acquisition is the only measure of his efficiency. In the "hierarchy of aims" of mathematics we may then include the aim of the teacher, and that aim is the *skill* in teaching the analysis and solution of problems.

Of the many illustrations that might be used I have selected the foregoing for the purpose of showing that in considering the aims as well as the aim of manual training we are not dealing with a new principle in education, but that we are studying an old principle with a new subject.

When primitive man first grasped a club to wield in offense and defense, or fashioned this club or other material into a rude tool for the purpose of assisting his hands in building his hut, his aim was practical. From that time to the present, through countless ages of stress and

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struggle, the growth from barbarism to the highest civilization is concomitant with the skill exercised in the improvement and use of this tool. In fact, skill is the only measure either of its degree of perfection or of its use. It is interesting to know the history of this tool, and the sociological relations of its many uses in the arts and sciences, and incidentally this knowledge and these relations are so all-pervading that they almost force themselves upon the minds of persons of ordinary intelligence. The wide significance of the uses of the hand is necessarily felt to some extent by all, but it is known in its greatest extent only by the few, and possibly by none. But to whatever extent it can be perceived by different individuals and however useful and interesting it may be, these relations are only incidental to the real content of manual training, either as *training per se,* or to its use and application in the experiences of life.

Manual training like other branches has many aims. The pure utilitarian aim of the primitive man has been perpetuated in all the arts and crafts of life as well as in all engineering and architectural courses. In the trade schools in all the countries of the world the manual arts have been employed for the purpose of giving pupils the skill necessary to compete successfully in the occupations of life. And this competition has always been successful just to the extent that the competitors have been skillful. Again, the world does not enquire of the man seeking an artizan's position, "By what method did you learn the mechanic arts?", but the question ever has been and ever must be, "Have you a skillful hand?". Not, "Did you enjoy every moment of the time you were sweating over your exercise in the school"?, but "Did you master that exercise"? Not, "Did you amuse yourself 'constructing' a toy to please a fleeting fancy"?, but "Can you use your tools man-fashion?"

Now, it is interesting to observe that manual training like other branches above referred to has its *aim;* and again that aim is *culture.* In this country we have claimed, and I think we may still, to a certain extent, claim that manual training does give culture equal in its own way to that of other studies, even when it is not intended to put it to practical use in its applications. But as in other studies, this will depend almost wholly on whether the training has imparted the power which alone can come through the somewhat strenuous acquisition of skill. Incidentally, it is necessary and interesting to contemplate this work in its wider aspects, to philosophize about it, to read about it and to hear lectures about it, even perhaps by people who know very little

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about it—people whose success and usefulness lies not in the skill of the artist or artisan but in the skill of talking. But it can not be too strongly insisted that this wider vision is not the culture that makes manual training valuable as a culture study; it is the skill acquired in the mastery of the technique which has been evolved by the race in holding tenaciously to the best practice of skilled mechanics. It is only by this means that the results of this evolution can be appropriated by the learner. We can, then, but conclude that the teachers aim must be the impartation of skill and it therefore follows that to do this he must himself be skillful. He must be skillful, not only in the execution of the processes of the mechanical art he teaches, but he must also be skillful in the art of teaching. It is through the acquisition of skill that the world's workers are produced. There are other ways to produce talkers, but workers must first learn to work, and this to be effective must come through skillful application. It must not be forgotten that excellence is qualitative, not quantitative.

The accompanying tables furnish an outline of the work in manual training and drawing done during the second year in the McKinley High School. To those who are most attracted by artistic, usable articles, these exercises will be somewhat lacking in interest. It is the joinery of the first year and the forging of the third year that give the most latitude and freedom to the hand. In these the hand not only guides the tool but furnishes the power. But to those who like to study the machine as an entirely new element in training, these exercises will be full interest. Heretofore the movements of the hand have been individual and independent both as to position and time, but now these movements must become co-operative and dependent. The boy must enter into partnership with a force outside himself. In the use of the lathe he can reach results only by combining his own force with that of the revolving piece of stock on which he is working. This force is uniform, unconscious and uncompromising. He sees before him a new condition which requires absolute conformity. This conformity demands the keenest attention and implicit obedience to the law of rotary motion. The lathe is a perfect disciplinarian. The attention always to be observed in the turning shop is beautiful to behold. The educational quality of this co-operation with the moving force of machinery is unique and of a high order. Here skill is not only permitted, but it is demanded, and as this demand comes from the unconscious motion of the lathe, it is uncompromising and inexorable. The hand at the turning tool must obey orders or something not in the program is going to hap-

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TABLE III.—TURNING.—SECOND YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
1st	1. Care and use of Lathe and Tools.	General.		
	2. Centering, Roughing and Straight Turning.	General.	Cylinder.	
	3. Taper Turning.	Spindles. Bats. Columns.	Spindle.	
	4. Compound Curve Turning.	Spindles. Newels. Posts.	Spindle.	
	5. Sandpapering, Staining, Finishing.	All Interior Woodwork and and Furniture.	All Exercises after No. 3.	
	6. Concave and Convex Turning.	Balusters. Posts. Spindles.	Stocking Darner. Spindle. Potato Masher.	
	7. Beading and Cutting Down Square.	Bed Posts, Fret Work, Spindles, Table Legs, Chair Legs, Porch Posts.	Carving Mallet. Table Leg.	
	8. Lectures on Materials.	General.		
	9. Tool Handle Turning.	All kinds Tang Tools.	Screw Driver Handle. Turning Tool Handle. File Handle. Chisel Handle.	
	10. Boring, Fitting and Assembling.	Loose Handles. Spindles. Balusters.	Rolling Pin. Revolving Spool. Holder.	
2d	11. Face Plate Work.	Rosettes. Corner Blocks. Goblets.	Rosette. Goblet.	
	12. Plug Chuck Work.	Napkin Rings. Jewel Boxes. Puff Boxes. Tea Caddies.	Napkin Ring. Tea Caddy. Jewel Box.	Constructive Design, Carving and Inlaying.
	13. Face Chuck Work.	Pattern Making. Interior Finish.	Jardeniere Stand. Pin Tray. Picture Frame. Ball.	Constructive Design and Carving.
	14. Gluing and and Built Up Work.	Pattern Making. Cabinet Making.	Goblets. Trays. Indian Clubs. Gavels. Dumb Bells.	Constructive Design.

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TABLE IV.—MOLDING.—SECOND YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
	1. Lectures on Metallurgy, Foundry Equipment and Composition of Commercial Alloys.	Foundry Practice		
	2. Preparation and Mixing of Sand and Facings.	Foundry Practice		
	3. Bench Molding.	Foundry Practice	Angle Block, Gland, Wrenches, Pipe Fittings, Pulleys, Bench Block and Face Plate	
	4. Making, Baking and Setting of Cores.	Foundry Practice	Pipe Fittings, Pulleys, Bench Block and Face Plate	
2d Cont.	5. Art Bronze Founding.	Bronzes, Medalions, Ornamental Brass and Bronze Work	Escutcheon, Push Button, Plate, Door Plate, Drawer Pull, Hinge Tail Medalion	Modelling in Wax
	6. Floor Work.	Foundry Practice	Pulleys, Pit Work	
	7. Management of Furnace and Crucible Melting.	Foundry Practice		
	8. Preparation of Charges of Brass and Iron.	Foundry Practice		
	9. Skimming and Pouring.	Foundry Practice		
	10. Cleaning, Tumbling and Pickling of Castings.	Foundry Practice		

pen. In addition to attention, the skill required exercises other definite mental functions. The conception of form which must guide the hand in holding the tool calls for an active effort of the imagination equal to that of freehand drawing. And this is true whether the turning is done by the use of a templet—a longitudinal surface pattern—or whether it is done freehand. In the former case this effort is employed in design-

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TABLE V.—DRAWING.—SECOND YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Design
1st	1. (a) Principles of Orthographic Projection	General Problems in Mechanical Drawing	Representations of Planes, Points, Lines, Rotation of Lines, Special Problems	
	(b) Design	Form of Turning Exercise	Design of Tool Handles, Napkin Ring, Tea Caddy, Jewel Boxes	Form
2d	2. (a) Intersections of Planes with Curved Surfaces	Sheet Metal Work and General Problems	Conic Sections	
	(b) Design.	Form and Decoration of Turning Exercises	Design of Jardinier Stand, Pin Tray, Picture Frame, Indian Clubs, Goblets, Trays, Dumb Bells	Form and Decorative
3d	3. (a) Intersections of Curved Surfaces	Sheet Metal Work and General Problems	Intersections, Cylinders, Cone, Spheres.	
	(b) Design.	Form and Decoration of Turning Exercise	Designs at Escutscheons and Door Plates	Form and Decorative
4th	4. (a) Line Shading	Rendering of Drawings	Geometrical Forms Ring and Pulley	
	(b) Design	Form and Decoration of Patterns	Design of Drawer Pulls, Hinge Tails	Form and Decorative
	5. (a) Shades and Shadows	Architecture	Geometrical Forms	
	(b) Design	Form and Decoration of Patterns	Design of Push-Buttons, Plates, Medalions	Form and Decorative

ing and making the templet, and in the latter case in the independent guiding of the tool, and is comparable to the guiding of the pencil in freehand drawing, for both must execute the conceived form, the one in co-operation with the machine, the other independently.

The application and meaning of turned articles are manifest, for they occur on every hand in both interior and exterior woodwork, and in furniture and other useful and ornamental articles. The part of the

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TABLE VI.—PATTERN MAKING,—SECOND YEAR

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
	1. Gneral Considerations, Drafts Shrinkage and Finish Allowances	General	Angle Block, Face Plate, "V" Blocks	
3d	2. Internal Draft	Hollow and Ribbed Patterns	Wrench, Gland, Pulleys, Gears, Cup Center, Surface Plate, Shaft Coupling Bill	
	3. Parted Patterns	Patterns necessitate two or more parts	Pipe Coupling, Pipe Return, Pipe Tee, Bench Block, Sheave Wheel	
	4. Dowels, Fillets and Fasteners	Parted and Ribbed Patterns	Surface Plate, Screw Jack, Face Plate, "V" Block	
4th	5. Core Prints and Boxes	All Cored Patterns	Levelling Block, Pipe Fittings, Pulleys, Ink Bottle Holder, Planer Jack	
	6. Ribbed Patterns	Ribbed Patterns	Screw Jack, Surface Plate	
	7. Built Up Annular Patterns	Cylindrical Patterns	Pulley, Bell, Propellor Blade, Cylinder	

turning course in which the chuck is used admits free play in constructive design, carving, and inlaying in proportion to the time and talent of the pupil.

The pattern-making and molding constitutes a significant part of the second year's work. The making of patterns requires much care and skill and the necessity of accuracy in their construction is enforced upon the mind of the boy when he comes to use them in his foundry practice, for a defect in his pattern would spoil his exercise. The finished casting embodies a series of inter-related operations, including the making of the pattern, which requires careful thought, protracted attention and the exercise of ingenuity and judgment; and in his use of both wood and metal, and the processes of handling them, the boy experiences many points of contact with the world's work.

In the next number along with tables showing our work of the third year I shall consider the relation of drawing to manual training and the significance of the art movement.

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A COLLEGE COURSE IN CONSTRUCTIVE DESIGN.

CHARLES R. RICHARDS.

UP to the present time very little has been done towards teaching form design in the schools in connection with constructive work. Much progress has been made of late years in the matter of instruction in surface or pattern design, but little has been attempted in any systematic way towards a consideration of the elements involved in the fundamental design of constructions in wood, clay or metal.

The reasons for this are not far to seek. In the first place, there enters into the problem of constructive design, so many elements, both functional and aesthetic, that it is not easy to separate one from the other; and in the second place, the considerations of proportion, contour and distribution of masses and members, are in many ways more subtle than the quantities presented in surface design, and correspondingly difficult to bring to the appreciation of young workers. It is much easier to start with a given contour, and then work out a surface decoration that relates satisfactorily to the contour, than it is to design an outline that shall be thoroughly pleasing in itself. In the same way it is easier to take a piece of construction, such as a table, and apply surface enrichment to it, than to so design the table that it shall be effective and self-sufficient merely by force of its proportions and outline. And yet, these latter considerations are, of course, in such structures, the fundamental elements of aesthetic effect, and of much more primary importance than the question of surface decoration, and for these reasons it is obviously demanded, however difficult the task may be, that instruction in this direction shall have a place wherever work in construction is attempted.

Functional considerations, of course, have first place in the problem. The adjustment of primary form and dimensions, material and structure to best serve the given end, must determine the fundamental design. When these considerations are satisfied, there is a margin in which purely aesthetic demands may be considered, and the material foundation refined and enriched, and made more interesting and pleasing to the eye. That these refinements should in no way interfere with the fulfillment of the first set of conditions, goes without saying.

In the actual conduct of the college course to be outlined, the first

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set of factors are always considered, but the emphasis of the course is placed upon aesthetic relations, and these alone will be given any space in the following pages.

It should be noted that this course does not touch the problem of surface enrichment, which is, of course, a legitimate and important element in the full problem of constructive design, but for the sake of concentration, confines itself to questions of outline, proportion and distribution of members.

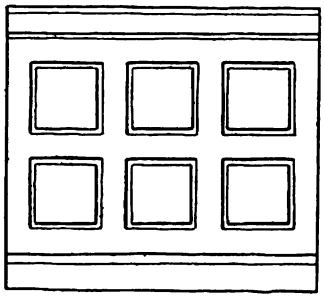

FIGURE 1.

The method of instruction followed is, first the definition of a concrete problem; the presentation of varied examples showing its successful solution, or that of other problems of the same type; the enunciation and illustration of certain general principles; and after the designs have been worked out, a comparison and criticism of the results before the class.

The writer does not regard an emphasis of guiding principles before the students work is attempted, however carefully and guardedly they may be made, as an ideal method of instruction. With the very limited time at the disposal of this course, however, and the fact that very few of the students taking it have had any large amount of art training, it would seem the most practical method of bringing out the significance of the quantities involved, and of covering the desired field.

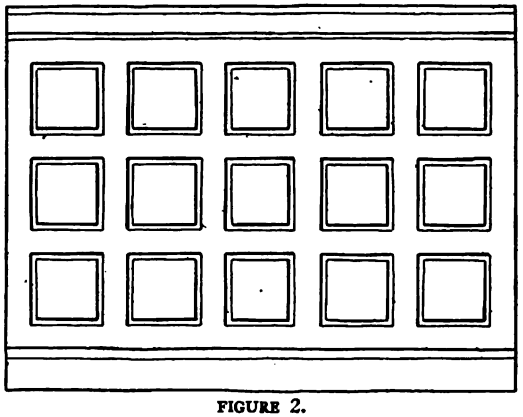

FIGURE 2.

The main principles brought forward are those of consistency and variation. By consistency is meant adjustment of form to function and the harmonious relation of masses and details. In it are included the ideas of balance, symmetry, rhythm and consonance of movement. Through variation, interest is gained by change and contrast of mass and line, enrichment and refinement of detail. On the interplay of these two

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ideas is built up whatever of principle is applied in the various problems.

Both invention and refinement of a motive are given play in the work of the course, but in most cases less emphasis is placed upon origination than upon the refinement and adjustment of a suggested motive.

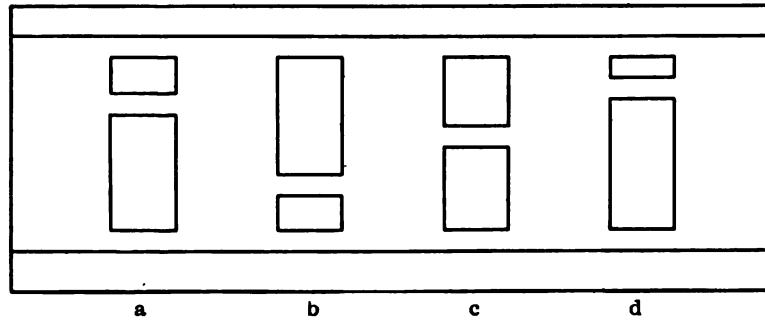

PLATE I.

Problem I. The first problem is concerned with the simple arrangement of rectangular masses, and deals with the distribution of spaces in a two and a three tier panelled wainscot, as in Figure 1 and Figure 2.

Such wainscots are, for the sake of economy, frequently built of equal square panels, and in this set and rigid form offer little of interest except in the play of light and shade on their differing planes. The conditions, however, afford an excellent opportunity for pleasing arrangement of spaces through nicely adjusted variation.

The possible modifications of a two tier panel are, of course, limited. The sense of stability would seem to demand that the larger panel be placed below as in a, Plate I, rather than above, as in b, and within this arrangement an infinite number of proportions are of course possible. To secure a thoroughly pleasing effect, it is essential to observe here the principle of subordination, and to proportion one of the panels as the clearly dominating mass, with the other as a secondary member.

Arrangements like c are obviously unsatisfactory because of uncertainty of effect, and those like d because of extreme difference in mass. In the latter case the eye feels a lack of relation between the spaces, and a shock of contrast in passing from one to the other.

The students' designs shown in Figure 3 and in Figure 4, have each a

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primary mass clearly emphasized, and a secondary mass in pleasing relation. It is possible that some of the simplicity of effect in Figure 3 may come from the similarity of portions represented by the two spaces. Such likeness of proportion between adjacent masses varying in size,

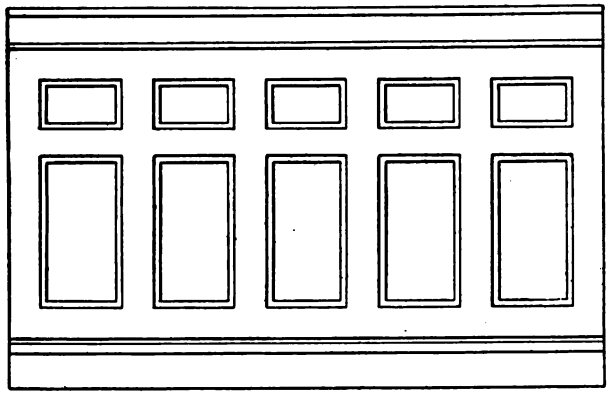

FIGURE 3.

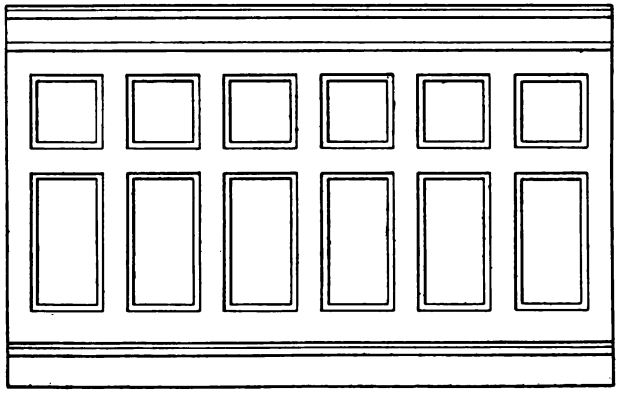

FIGURE 4.

often exerts a strong influence in uniting what would otherwise be a confused and complicated effect.

Greater interest of effect may be gained by variation horizontally as well as vertically, as in Figure 5, and by still further differentiation as in Figure 6.

With a three tier arrangement, a greater number of arrangements

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are possible. Some of these are shown in Plate II. One dominating mass and two equal secondary masses, or three varying masses are possible, the latter tending to greater richness of effect.

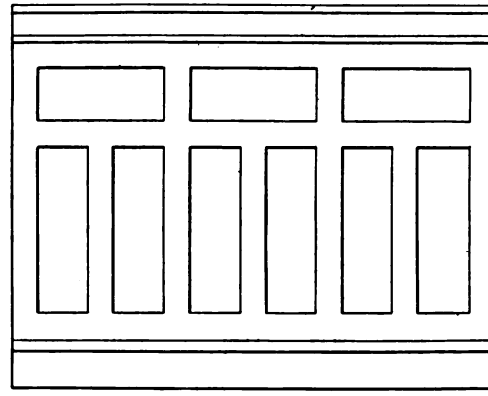

FIGURE 5.

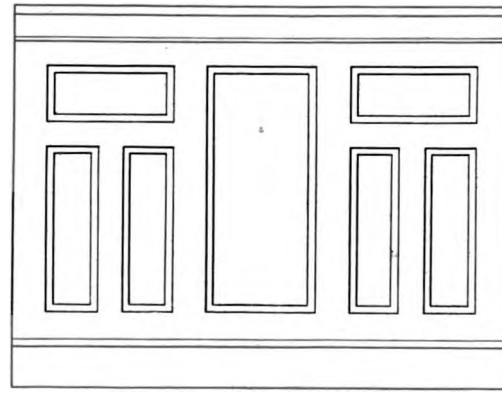

FIGURE 6.

The order of the spaces one to the other is of primary interest. The arrangement of a is geometrical and obvious. It is like the scale in music. It is continuous movement without bounds. The eye is carried onward but never brought to rest. b and c employ the same masses but have beginning and end. They are balanced—static. They stay in the frame.

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Students designs are shown in Figures 7, 8 and 9. It will be noted that in these designs the uniform width of frame enclosing the panels exerts an important unifying influence upon the entire effect. A

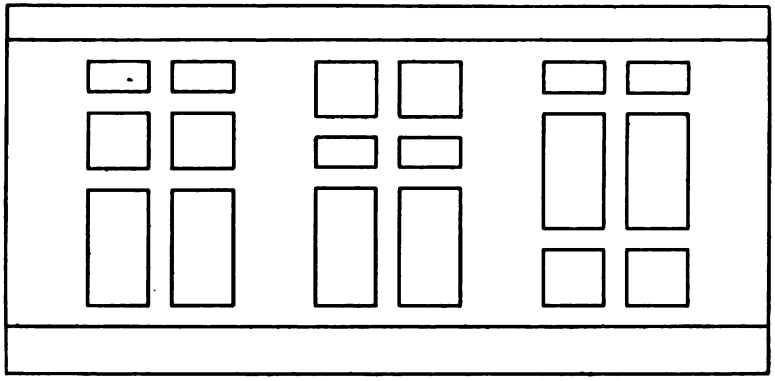

PLATE II.

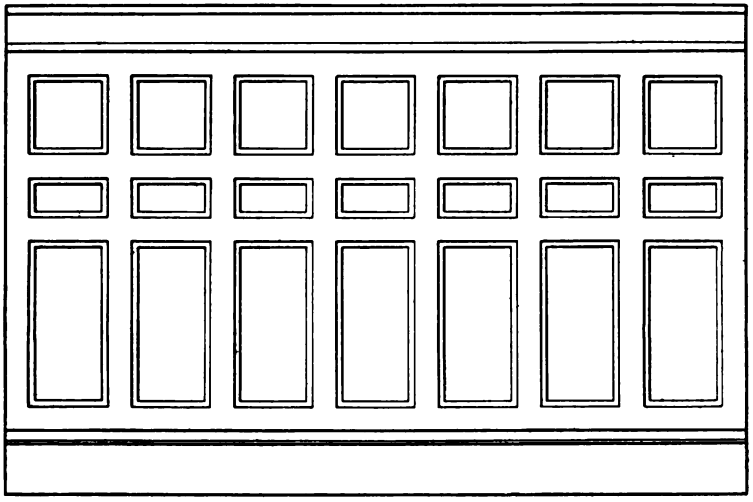

FIGURE 7.

change in the size of the rails enclosing a small panel, is sometimes desirable, as in Figure 8, but this should be made very carefully, as any such change tends to further complication of effect.

Problem II. The panelled door presents much the same problem

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as the wainscot, but in this case the distribution of masses is more affected by functional considerations. The lowest rail of the door is always made larger for reasons of strength and resistance to wear, and

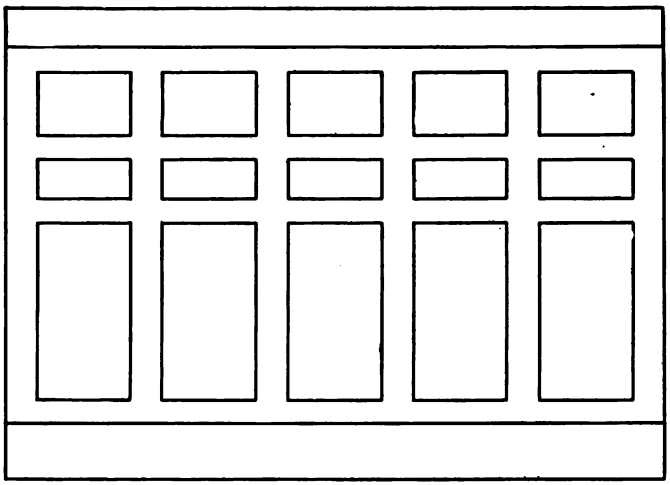

FIGURE 8.

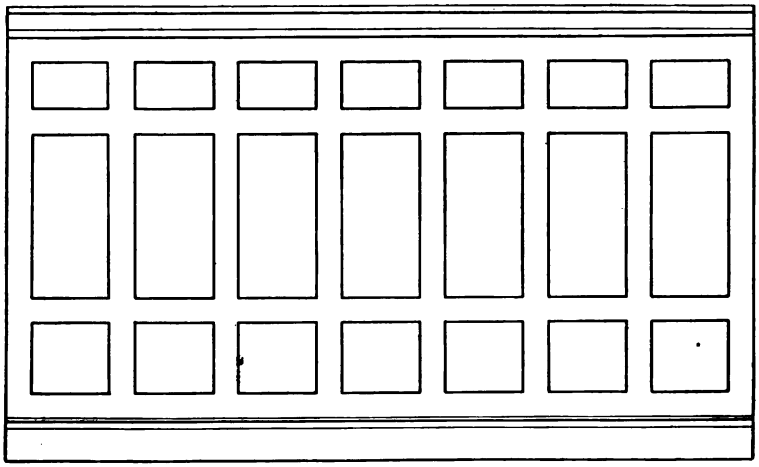

FIGURE 9.

one of the other rails is generally so placed as to lend support to the lock and handle. In the days of rim locks this lock rail was so placed as to receive the lock centrally, as in the Colonial door of Figure 10. With

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a mortise lock such a position would weaken the joint which holds the rail, and in consequence the rail is nowadays placed somewhat above or below the lock.

At the present time, in doors made for inside use, not so much importance is attached to this supporting function of the lock rail as formerly, but from the purely aesthetic side, it is a question whether recognition of the importance and evident function of the lock can be omitted without detracting from the effect, as witness Figure 11.

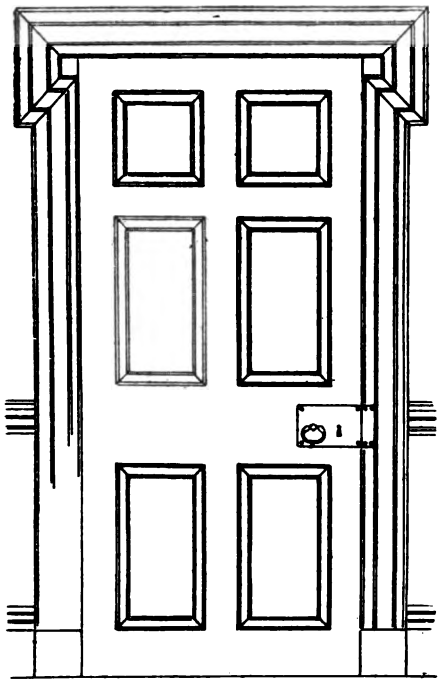

FIGURE 10.

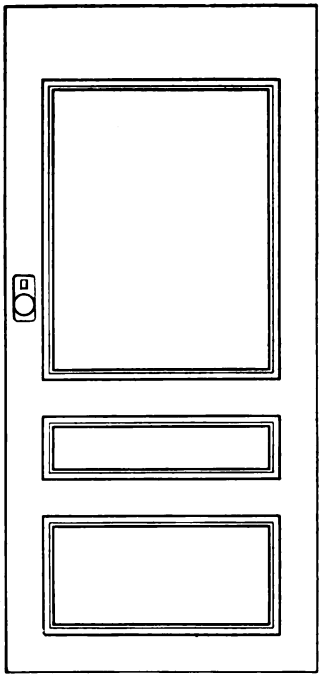

FIGURE 11.

In the older doors of the simple house type, the panels were made solid, and the width of the panel, both for the sake of strength in the frame, and in order to lessen the results of shrinkage, was comparatively small, seldom running over ten or twelve inches. Today, with the use of built up panels, the width is increased, and it is now common practice in such doors to use one panel filling the entire width, as in the last figure.

The first door problem is that of an inside single door, with the usual limits of dimensions. A number of the most common types of panel dis-

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tribution is illustrated in Plate III. It is evident that the same principle of subordination enters into the movement of the panels, as in the ques-

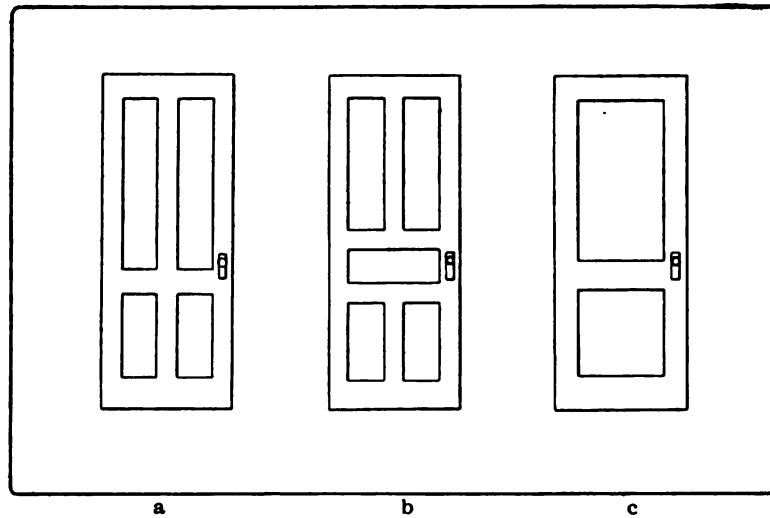

PLATE III.

tion of massing. A design like Figure 12 gives a half-way effect. It is neither vertical or horizontal, and is uncertain and unpleasing for that reason.

On the other hand, in an arrangement like b, Plate III, the dominant vertical movement of the panels is in harmony with the shape of the door, but its otherwise meager effect is relieved, and an element of vivacity added by the single contrasting cross panel. Examples of students' designs are shown in Plate IV.

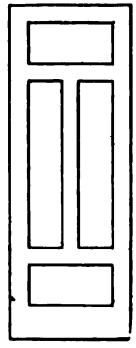

FIGURE 12.

Figure a is in danger from the uncertainty of movement referred to above. The effect of this design would be improved by an increase in the width of the bottom rail. In c the rails show well-studied proportions but the lock is badly placed from a structural standpoint.

Problem III. Larger doors present opportunities for more elaborate groupings. In outside doors both the effect and appearance of strength is aimed at, and such doors, when made of wood, often have the panels arranged in squares, with heavy encompassing frame work.

In the inside double doors of the salon type, however, a natural

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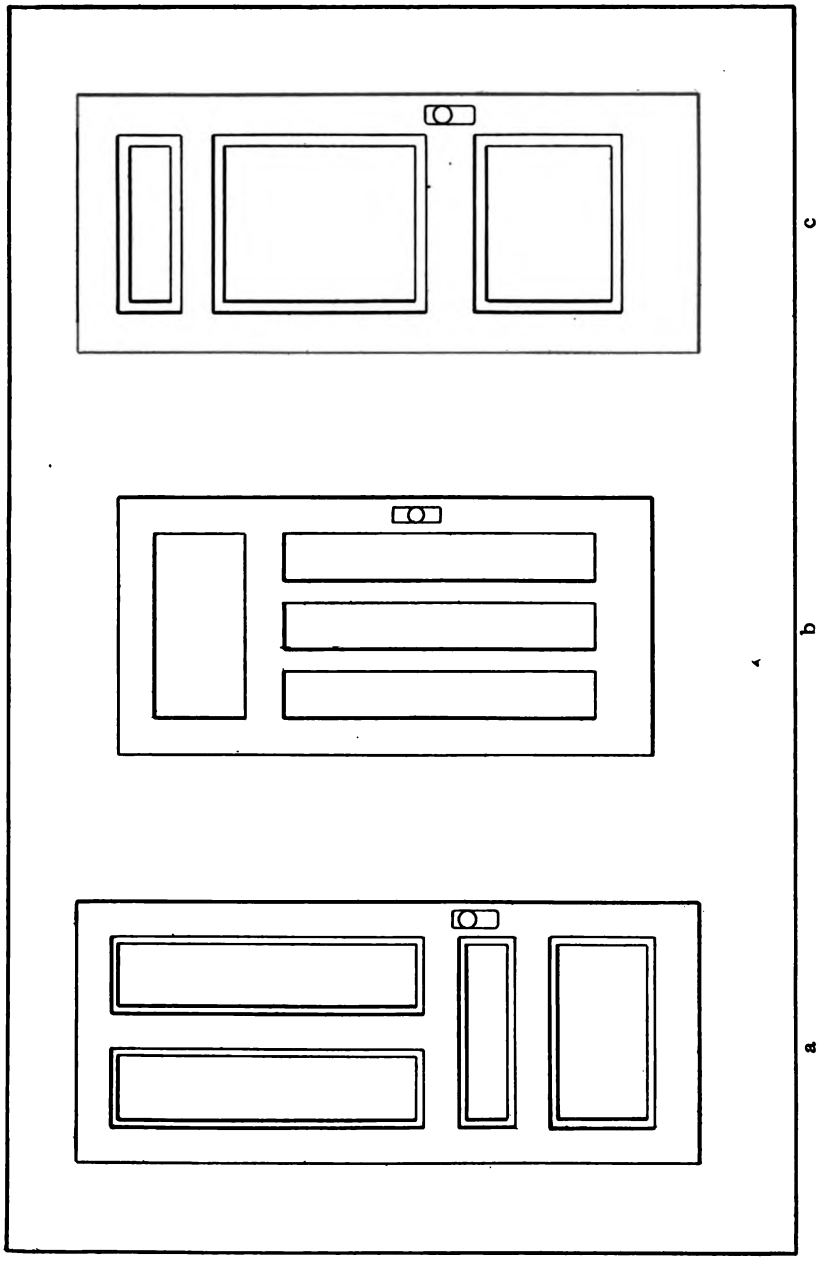

PLATE IV.

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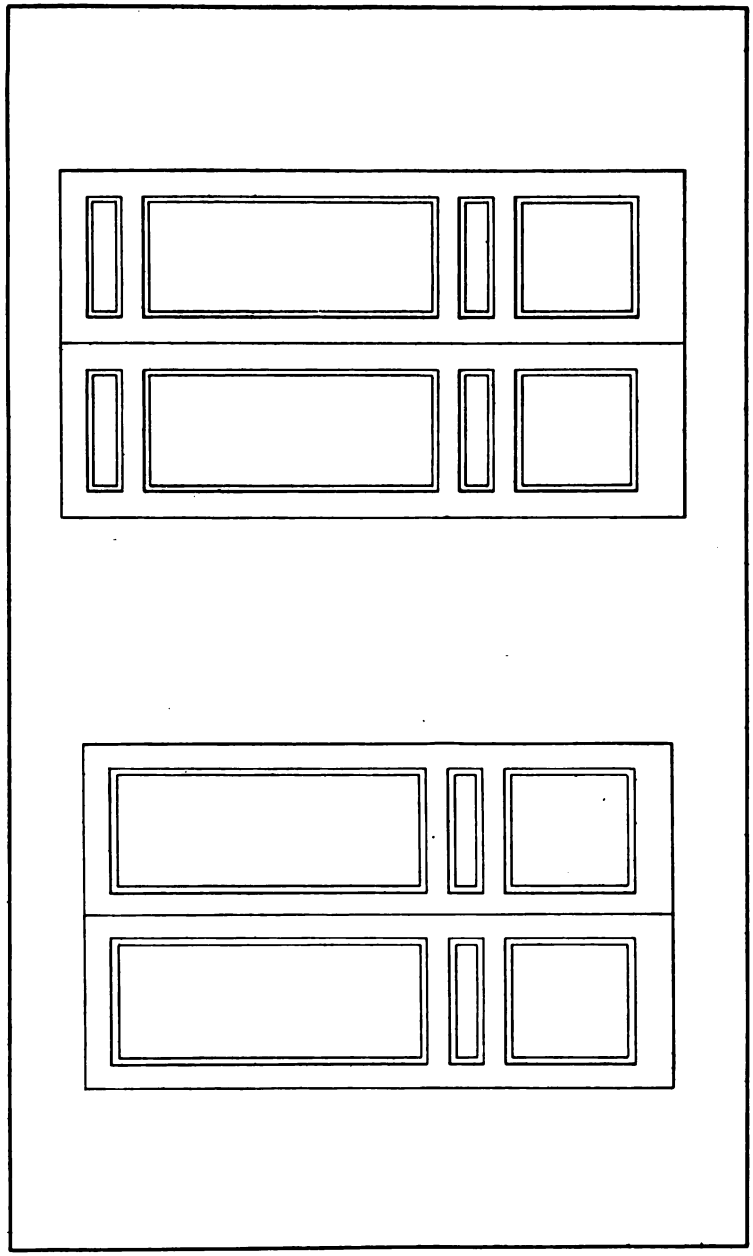

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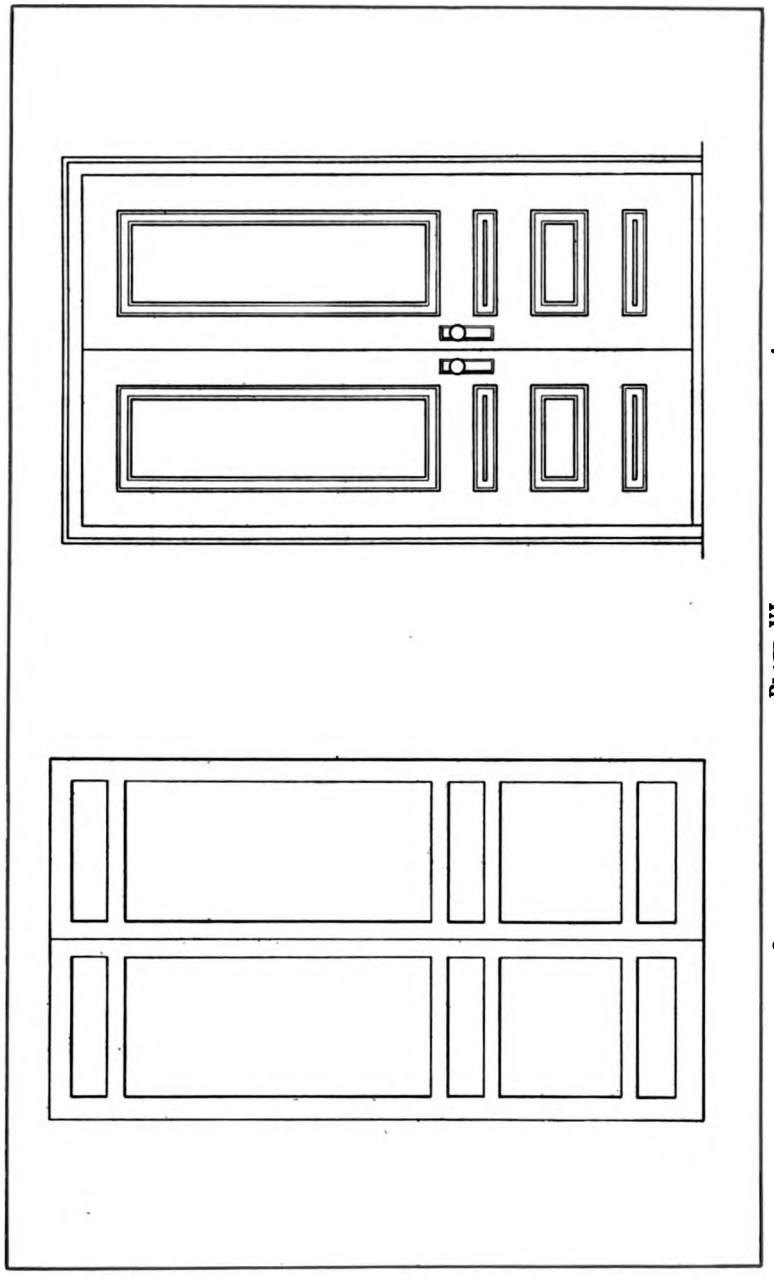

PLATE VI.

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opportunity is presented for rich and varied grouping. The French have excelled in this study of panel spacing, and doors of the Louis XIV, XV and XVI periods, present exquisite examples of panel division. Figure 13.

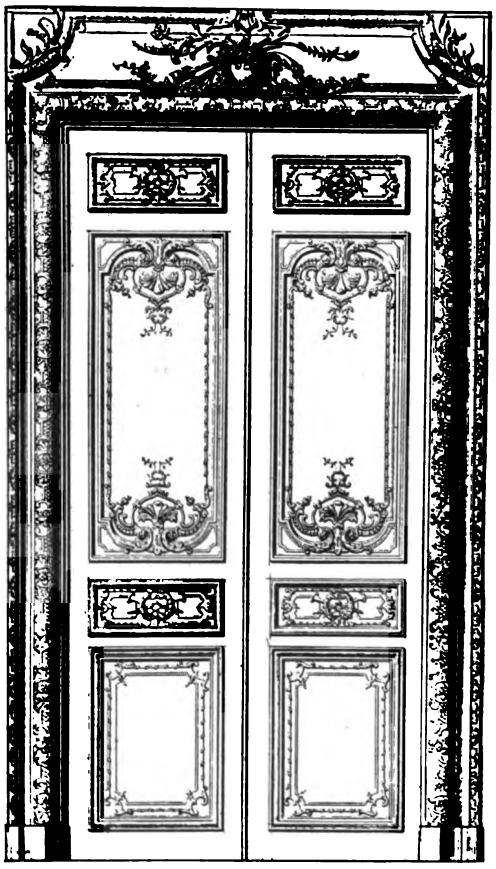

FIGURE 13.

The Japanese also, in their temple and palace gates, have dealt with this problem of panel spacing in a charming way, using generally some variation of the motive shown in Figure 14.

In the tall double door, running up to perhaps nine or ten feet, it is evident that a greater number of single divisions may be employed than in the lower single door. A fourth division often takes the form of a small panel at the top, and here a nice question is presented as to whether

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this is better made of the same size as the other small panel, or a fourth unit of size introduced. The latter is a move away from simplicity of effect, and the adjustment must be nicely studied if it is to result in an improvement in the design.

Students' designs are shown in Plates V and VI. Figure a in Plate V would probably be improved if the small panel were made slightly larger and the width of the enclosing rails somewhat reduced. Figure a, Plate VI, possibly suggested by a Japanese example, shows a well distributed panel scheme but is weak as to the width of both stiles and rails.

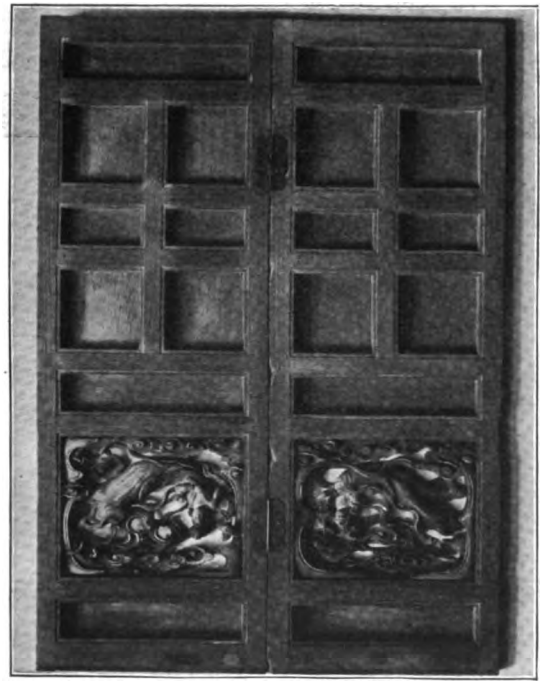

FIGURE 14.

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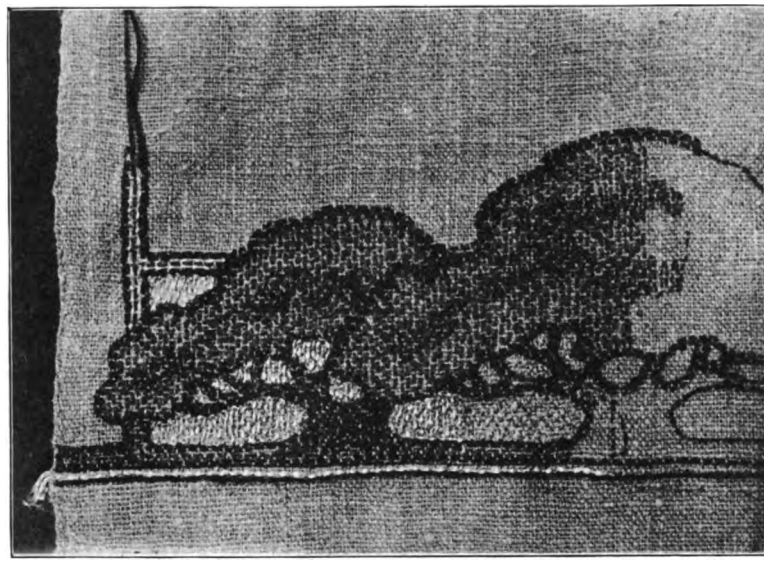

G. R. SMITH

LIVE OAK TREE MOTIF.

EMBROIDERY.—II.

GERTRUDE ROBERTS SMITH.

"Embroidery is not among the things which have to be done. It is in the nature of a superfluity; the excuse for it is that it is beautiful."

THE expression of art in embroidery is primarily design-thought in stitches,which defines clearly some orderliness of space relations and, at the same time, exhibits care in the selection of materials. Whatever the purpose for which an article is being beautified with stitches, durability and fitness should be considered. The hours of painstaking labor involved in planning and executing a design motif, however simple, becomes labor unworthy its art unless there be in it lasting quality. As a rule it is desirable to put a richer material on a simpler, as silk on linen, rather than linen on silk but whatever the character of the cloths selected, let them be the best of their kind. Shiny stuffs, as silk and satin are to be avoided, as hard and unsympathetic. Brocade has less danger as its pattern gives broken light. Linen is, when all the qualifications desirable for embroidery are considered, a most satisfactory fabric, and can be obtained in such variety of color and texture, that for the present we will consider its use alone.

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The natural colors are safest and in the end best, for as we have noted a rising scale of richness in the materials we are superimposing, so we avail ourselves of the impressiveness given by an increasing color scale. A jewel-like quality is obtained by opposing color to a proper neutral, and toned linens give to color schemes something of the envelope we so admire in Japanese prints. The round threads and slight irregularities found in hand spun and woven linens recommend them especially for our purpose. When studied, the range of color from light to dark and warm to cold, offers limitless scope for the application of color in embroidery. If expense is not to be considered, these linens may be woven to order and in any shade desired. For many purposes, however, the Russian peasant crash, obtainable in most dry goods stores, is beautiful and inspiring. The fact that its width is limited to from fifteen to eighteen inches, is sometimes an obstacle in its use, but when frankly seamed together, it can often be treated as one width. These linens vary in price according to their fineness, costing from twelve to thirty cents a yard.

Linen embroidery thread which could be very valuable to the needleworker is practically prohibited since, from the nature of its fibre, it will not hold dye, and the rubbing of a thread as it passes and repasses through cloth will fade colors that are unaffected by sunlight. Fading in wash is largely brought about by the same cause. Mercerized cotton has been so developed that its texture is not unlike silks and may be used when the colors have been tested. The embroidery threads sold in art-craft shops and recommended by them as vegatable dyed give to the worker all the advantage of individual experiment without the tediousness and discouragement attendant upon controlling coloring matter at first hand. Tussah silk has a quality in its color and texture, which is well nigh perfect in connection with the homespun linens, and it is to be regretted these really splendid Oriental silks are so little appreciated that it is difficult to get them in this country.

The transferring of designs to rough cloth offers many obstacles, as impression paper and the powders used on smooth material fail to enter its interstices. Experience has proven that a sure and comparatively easy result is obtained by cutting the design, stencil fashion, from tough paper and tracing round it with an ordinary pen and water proof ink.

This description of materials and methods has been given with the thought of their practical application, presupposing a love of the subject with ordinary control of the needle and some ability to express space

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relations in drawing. Desiring to make our discussion still more specific we will give it the form of a problem, selecting for our purpose a runner or rectangle of linen to be embroidered.

The uses to which the embroidered runner may be put are varied and

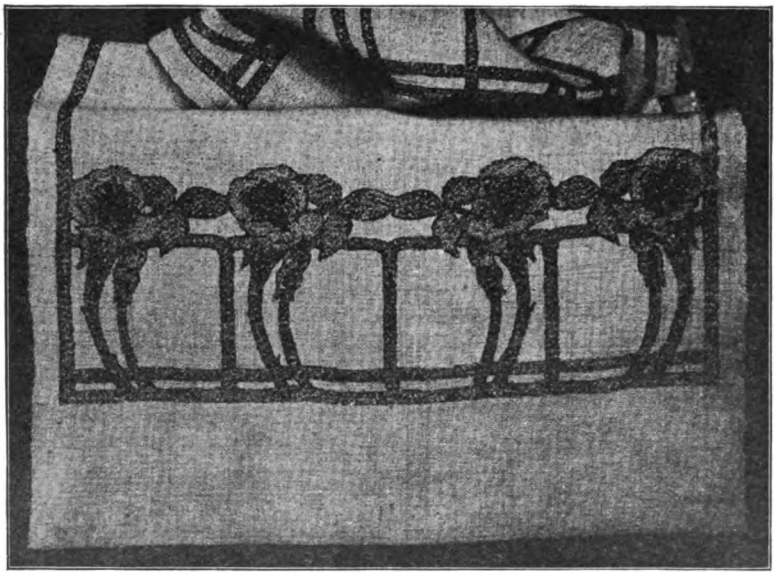

FIGURE 1. K. SIMPSON

in considering these in connection with the shape, we have our design partially suggested. If our rectangle or runner is planned to go in some fixed place its position will more or less define the design spacing. If the rectangle is to lie on top of a table its relation to the whole as well as to its parts should be recognized. If it hangs over the edge of the table the amount of cloth and the division of it into spaces becomes the important thought. In either case the hem, which must finish the raw edge of the material, cannot be ignored, and it is best to make it consciously a part of the construction, in proper width to bind the design well down to the other space divisions.

The straight line of the hem most naturally suggests a band or its equivalent in the design treatment, and should we confine ourselves to it alone, there would be endless opportunity for invention within the space.

The band holds the edges of the cloth together, at the same time emphasizing the hemmed ends. It is here we should develop our greatest design interest, either by concentration of thought in the middle of the

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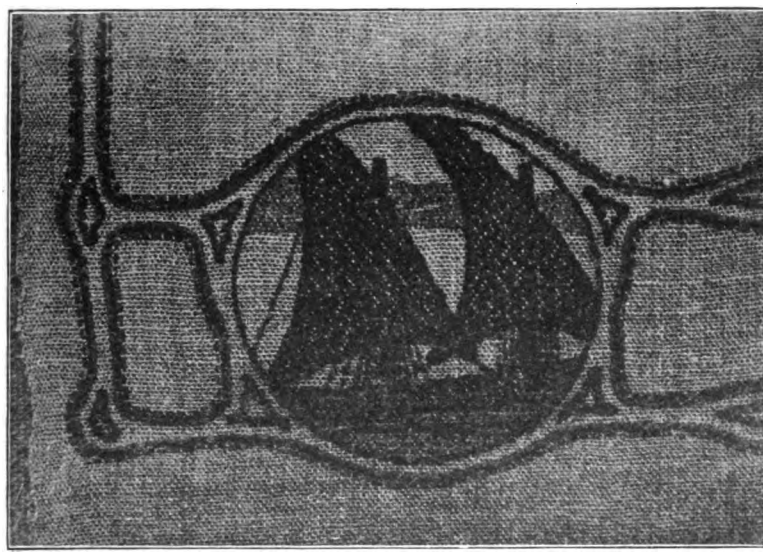
space or toward the corners, the weakest arrangement being that in which the design travels uniformly from edge to edge of the cloth, suggesting a machine woven pattern which could be cut off by the yard. The utterly to be rejected design in this space is the one-sided unit which enters the cloth at one edge and ambles along to its exit on the other.



M. DELAIRGUE

FIGURE 2.

The spot arrangement so satisfactorily demonstrated in oriental needlework offers an alluring field in which there are many pitfalls, for detached unconstructed units are tiresome unless there be in them some naive quality which we recognize as genius.

Figure 1[1] shows an arrangement of roses in which the relation of hem and design to uncovered space have been carefully considered. The cloth is coarse linen, of cool grey tone; the design is in soft greens, blues and old roses. Here the strong color value might allow the proportion of uncovered space to be increased, until the hem and pattern stand in minor relation to it without the latter suffering.

In this design we have preserved the band or border thought, the interest being almost equally distributed in the space, yet conveying perfectly the impression that the design is complete in itself and made so in relation to definite dimensions. The simplest possible stitch has been

[1]Figures 1, 2 and 3 are used by permission of Newcomb College, New Orleans.

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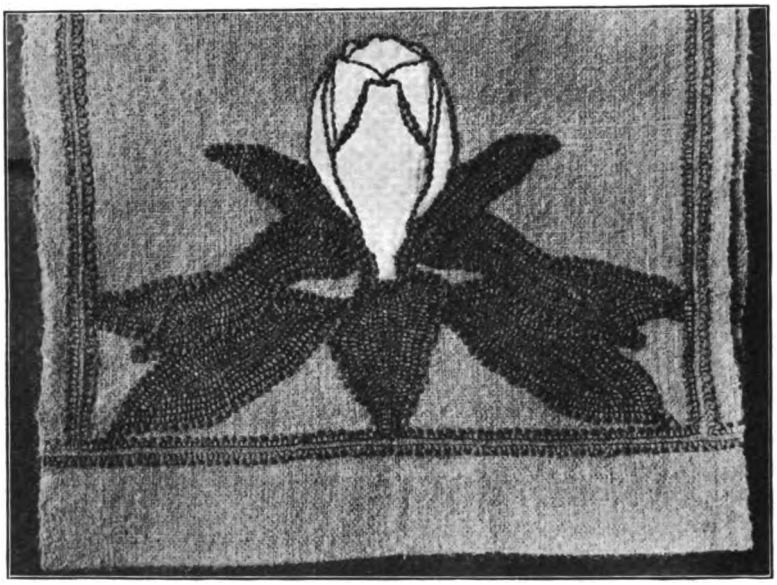
used in its execution, the silk embroidery thread following the warp or woof over and under as in darning.

Figure 2 shows one-half of a design planned for the end of a rectangle similar to the one already described. Here we have the interest centered in the two medalions, which were carefully spaced in relation to



T. MAURAS

FIGURE 3.

the edges of the cloth and to each other. The bands which form structural lines holding all the parts of the design together are placed, as in architecture, where the construction is most apparent, or where the lines of beauty may be made stronger and more complete. The colors, dull blue, green and terra cotta, with touches of purple carried through the scheme, give further emphasis to the thought by being forced in the medalions. The mass of color in the terra cotta sails is supported by the introduction of a brighter blue in the distance than appears in the bands. This runner was planned to go on a mahogany table and its values made accordingly robust.

Figure 3 is another arrangement of ornament on the runner. The magnolia bud motif with its divisions and strong contrasts forces attention to the middle of the space. Coarse linen of a warm brown tone was selected for the background. The other colors are bronze greens, blues and purples with deep cream in the flower. The character

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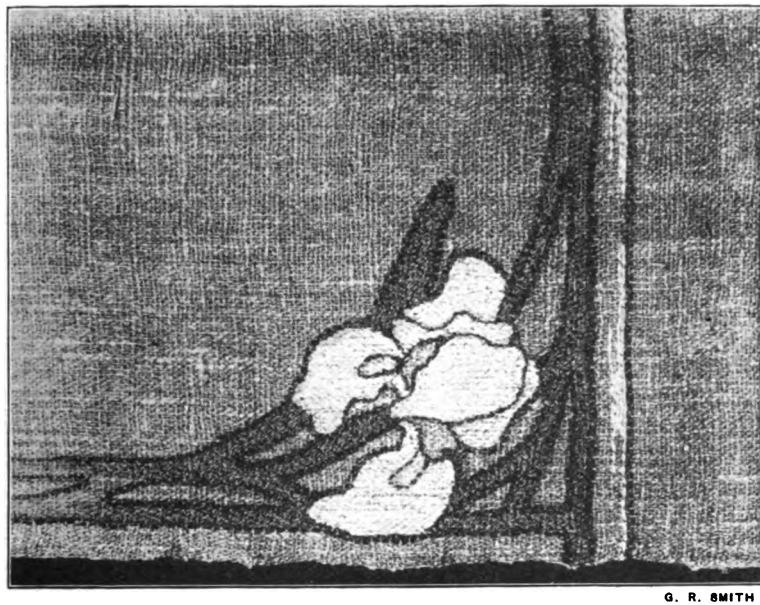
of the blossom lends itself to applique and a smooth silk has been used to assimulate the texture of the flower.

With all applique a strong outline is necessary, and here the same one has been carried through the whole design. Several threads of dark green and red purple were sewed down, or couched, with a single thread



G. R. SMITH

FIGURE 4.

of blue. The leaf spaces were filled in with button-hole stitch, row after row having been placed with some effect of modelling. By keeping several needles in the work, colors were broken at will; three different greens of the same value were used in each leaf, and variety was given without disturbing the flatness of the decorated surface.

In Figure 4, fleur de lis motif, all parts of the design play one into the other. The arrangement in the corners is dependant for its complete comprehension upon lines at the sides and hem of the rectangle. Such a design is seen to best advantage lying full length on a horizontal surface. This is the design form which perhaps offers the greatest scope for subtle beauty and variety. A complete unit in itself, its possibilities for pleasing are unlimited.

Fine design comes from a full experience and, whether the motif chosen for a runner be purely abstract lines or material which in itself tells a story, beauty and its adaptation to cloth should be the fundamental thought.

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A COURSE OF STUDY IN MANUAL TRAINING[1]—I

CHESHIRE LAWTON BOONE.

THE course of study as suggested in the present article and those to follow is not a theoretical compilation. Each topic and problem has been tried not only in one grade, but oftimes in several and the exercises described are the residue after a long process of selection and rejection. A general outline of the scheme for the primary grades, will be found in the MANUAL TRAINING MAGAZINE for April, 1907, in which is stated the basis upon which the work is planned. Any other set of exercises than those mentioned might well be used; it is only contended that whatever group is chosen, that they shall be centered in some definite way about one idea, or groups of related ideas.

In addition to the primary work referred to, this series of papers will include pottery-making, basketry, work in wood, and a series of discussions, with drawings of several mechanical problems, as the water wheel, pumps, kite, printing press, motors and electrical apparatus. These grammar grade projects are planned in the same way as for primary work, in series, closely related. It is hoped the articles will show that there is some guide by which a course may be planned, to produce sensible results, and command the attention of the diffident ones, as well as build up the creative powers of children.

YEAR I.

THE PLAY HOUSE.

The play house is a typical first-year project. It involves an amount of "making" of a simple kind, and uses a variety of materials. The work can be extended or condensed to suit classroom conditions, without in any way impairing the problem as a whole.

Materials—For the house a number of packing boxes (soap boxes for choice) are secured, and two sides of each removed, leaving not a house, but a *room* in each case. A real play house, with a roof, is attractive but the rooms are dark and hard to get at in furnishing them. For school purposes, boxes are easier to handle and as satisfactory.

For the furniture to be placed in the various rooms, any firm, tough paper, which first grade children can fold accurately, will do. The best

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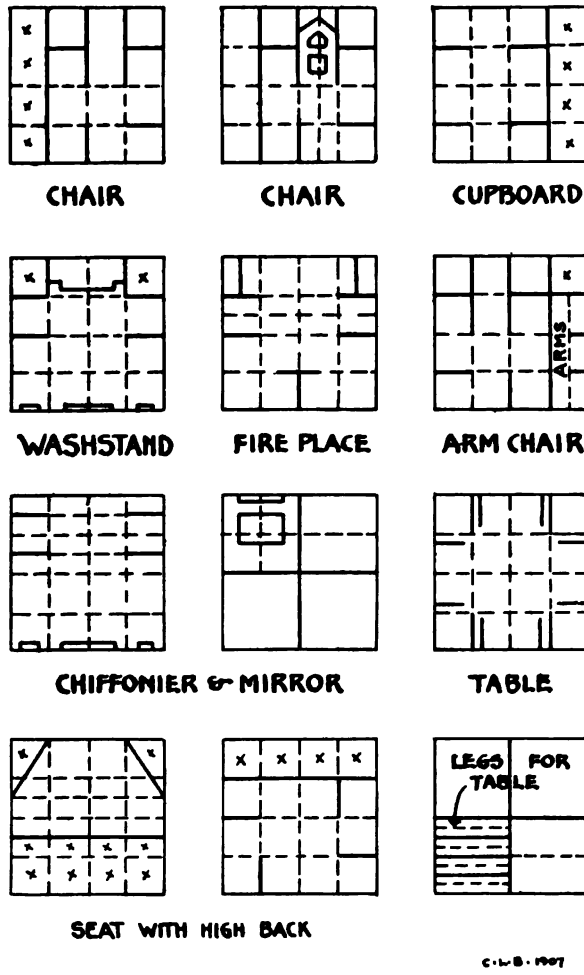
CONSTRUCTION
YEAR·I



material is 30 lb. cover paper of tone suitable for tables and chairs. Unless otherwise stated the paper is cut square and a standard size—in the present case, 6-in. x 6-in.

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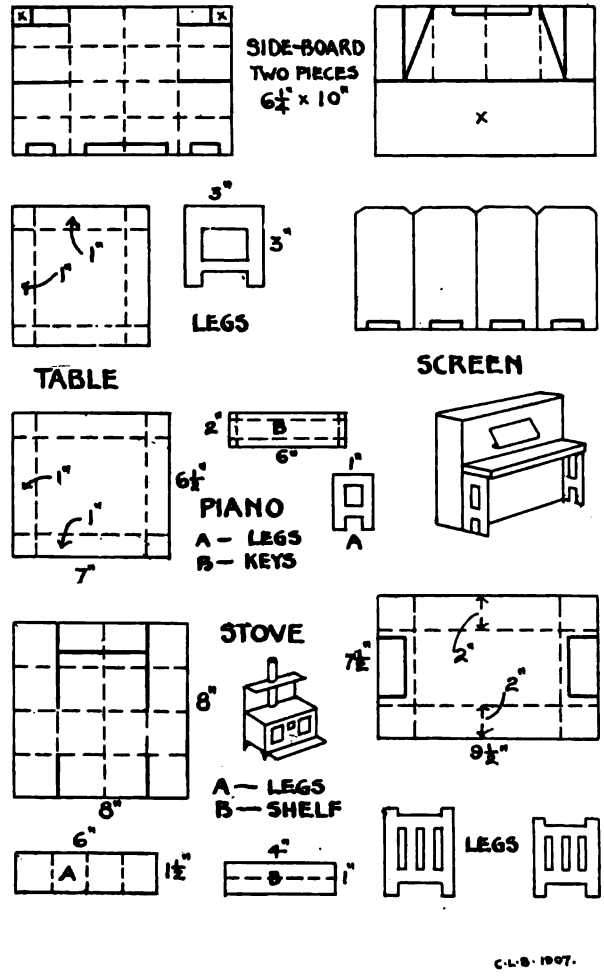
CONSTRUCTION
YEAR·I



Natural and colored jute is the best stuff for weaving rugs for the rooms. The looms are strung with common carpet warp, or any strong cotton twine. The best loom for use here, is one of cardboard, a little

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larger than the size of the proposed rug. The cardboard should be notched at the ends with notches about ½-inch apart for stringing.

The walls of each room ought to be papered with bogus or cover paper, or some material of good tone.

Explanation of Plates—The drawings presented herewith give details of construction for making typical pieces of furniture. The dotted lines in the drawings show where the paper has been folded. The cutting is to be made on full black lines. Portions indicated by crosses are cut off entirely.

As already suggested, most of the articles are made from square paper 6-in. x 6-in. When this is not possible, the paper should be furnished to pupils in the right size, and the measurement necessary accomplished by means of kindergarten tablets or strips of cardboard, rather than rulers.

It is advisable to practice the simpler foldings and pasting, first, with manila paper, until the technique is understood. Library or stock paste is used for finishing the work.

If any design is used on the wall paper, it should be some simple border, near the top—the mere repetition of motifs suitable for decoration of a given room as vegetables, animals, utensils, landscape.[1]

Weaving has been so fully treated in other places that no explanation of it is needed here. It is enough to say that weaving for its own sake has little value, and expensive, complex looms have no place in this grade. Since rugs are needed to furnish the rooms, each child makes at least one, perhaps more, and the best are used.

Other details incident to completing the rooms, must be left to individual taste; pictures, windows and curtains will be arranged to suggest the reality desired.

In addition to the play house there are a number of isolated problems which also find their way into the year's work.

Things like Christmas gifts, valentines and the like are perennial exercises, but though important, are mere incidents in the year's plan as a whole. These special exercises wll be treated as a separate group later.

[1]Design in the Primary Grades by Julia Cremins, Year Book of the Council of Supervisors of the Manual Arts, 1904. An excellent discussion of primary design.

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A GRAMMAR GRADE EQUIPMENT FOR WOODWORKING AND DRAWING.

CHARLES H. BAILEY.

IT is impossible for any one person to make lists of equipment for manual training work that will be satisfactory under all conditions and meet the approval of all teachers. Each teacher who has had experience in work of this kind has his own ideas about equipments; and tools that are considered absolutely essential by one teacher may find no place in the equipment of another. Still some definite lists of equipment may be suggestive and helpful, particularly to teachers who have not had a wide experience and who have no very definitely fixed ideas on the subject.

In equipments for woodworking, especially, there is great diversity both as to the number of tools used, and as to the division into individual and general tools. There are certain tendencies, however, along this line that seem to be making for greater uniformity, and one of these is the inclination on the part of teachers of woodworking to reduce the number of tools that are classed as individual tools; and in fact to have the least possible duplication of tools throughout the entire equipment. The lists of equipment given here are made out in accordance with this idea. The reduction of the tools to the least possible number lessens the cost of equipment and also makes it easier for the teacher to take care of the tools and keep them in good working order. It is greatly to the teacher's advantage to have as few tools as it is possible to use and still do good and effective work.

Teachers of little experience, when called upon to order and install equipment for this sort of work, are very likely to make the mistake of ordering more tools than are essential, thus unnecessarily increasing expenditures. This has been done many times and the extra tools afterwards discarded. It is hoped that the lists of equipment given here may prove suggestive and helpful to such teachers and enable them to avoid the mistake of over duplication of tools.

It is intended that these lists shall be merely suggestive. Perhaps no teacher would be willing to take them outright. Some will doubtless feel that they are insufficient. They are made out, however, with the idea of meeting the needs of the ordinary public school where the item of cost is usually so important as to be almost the determining fac-

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tor in the introduction of this work, and it is believed that the equipments suggested here will meet the needs of such work without being excessive in cost.

Tables I and II give what is considered a reasonably generous equip- equipment should be sufficient for almost any work that can be done by the pupils in the grammar school.

TABLE I.

24 single benches, 3-ft. 6-in. long, 2 wooden vises	$192.00
24 Bailey's iron jack planes, No. 5	37.00
24 Disston's back saws, 10-in	26.20
24 Buck Bros. tanged firmer chisels, ¼-in. No. 2	5.00
24 Buck Bros. tanged firmer chisels, 1-in. No. 2	8.00
24 try squares, 6-in. iron stock	5.25
24 marking gauges, beech wood, plated head	2.85
*24 rules, boxwood, 12-in	3.60
*24 sloyd knives, 2½-in. blade, riveted	6.50
24 bench brushes, 5-in. block	5.60
*24 Bradley drawing kits, 10 x 12-in	7.50
24 pencil compasses and pencils	3.00
*24 bench hooks	3.50
*24 mallets, hickory	4.00
Total	$310.00

In some cases, however, it is not possible to install the work so completely, and in such instances it is suggested that the items in Table I marked with an asterisk (*) be omitted from the individual tools. The rules and knives may be provided by the pupils, and they may make the T-squares, triangles, drawing boards, bench hooks and mallets.

Table III gives a reduced list of general tools which will do very well for a class of twelve and may be made to serve for a class of twenty-four. It is about the minimum to which the general tools may be reduced and still allow of any sort of effective work.

There are a number of ways in which benchwork may be conducted with limited equipment. In the first place there is the possibility of providing a small number of benches well equipped, with a reasonable complement of general tools, and conducting the work with small classes. Thus an equipment for a class of six, based upon the lists given in tables I and II, might be purchased for about $100.00.

Again, a larger number of benches may be provided, with just enough tools to enable some work to be done, and the number of tools increased

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TABLE II.

2 Bailey's iron fore planes, 18-in., 2¾-in. cutter	$ 4.10
2 Stanley's iron block planes, 6-in., No. 16	1.60
6 Disston's D8 rip saws, 22-in., 8 point	7.00
2 Disston's D8 cross cut saws, 22-in., 10 point	2.34
2 turning saw frames, 14-in	2.00
6 turning saw blades, 14 x ¼-in	.60
1 steel carpenter's square, nickle plated, No. 105	.85
2 sliding T-bevels, 6-in, iron stock	.40
3 screw drivers, Champion, 4-in	.75
1 screw driver, Champion, 6-in	.35
1 Coe's monkey wrench, 10-in	.65
2 Barber's ratchet braces, No. 14, 6-in. sweep	1.80
1 set Russell-Jennings auger bits	4.25
1 set twist drill bits for wood, 7 in case	1.15
1 Rose countersink, 5/8-in	.15
1 glue pot, 2 pints	.50
4 Buck Bros. outside gouges, No. 8, handled, 1-in	1.75
2 Buck Bros. outside gouges, No. 8, handled, ½-in	.65
1 pair Colt's eccentric clamps, to open 3-ft	2.10
6 Wooden hand screws, 8-in	1.70
12 Wooden hand screws, 10-in	4.05
6 Wooden hand screws, 12-in	1.70
2 winged dividers, 5-in	.40
1 winged dividers, 10-in	.32
6 half round wood files, open cut, 8-in	1.35
6 hammers, Maydole, No. 13	3.00
4 nail sets, assorted sizes	.40
2 cabinet scrapers, 3 x 5-in	.40
2 India oil stones, 7 x 2 x 1-in	1.20
1 oil can	.10
1 Washita oil stone slip, 4 x 2-in	.20
1 smooth mill file, 8-in	.20
1 grindstone in wooden frame, 24 x 2-in	4.40
8 iron spoke shaves, adjustable	1.80
1 New Langdon Mitre box, No. 22	7.30
1 scraper steel	.20
1 Goodell's geared hand drill, No. 5½	2.25
1 Jones' ratchet coping saw	.60
12 coping saw blades	.15
2 Buck Bros. tanged firmer chisels, No. 2, ½-in	.50
Total	$65.21

as the funds materialize. If a special teacher is employed, this method may be the more economical as more pupils may be given instruction in the same length of time.

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TABLE III.

1 Bailey's iron fore plane, 18-in, 2¼-in. cutter	$ 2.05
3 Disston's D8 rip saws, 22-in. 8 point	3.52
1 Disston's D8 cross cut saw, 22-in, 10 point	1.17
1 turning saw frame, 14-in	1.00
3 turning saw blades, 14 x ¼-in	.30
1 steel carpenters square, nickel plated, No. 105	.85
1 sliding T-bevel, iron stock, 6-in	.20
3 screw drivers, Champion, 4-in	.75
1 Coe's monkey wrench, 10-in	.65
1 Barber's ratchet brace, No. 14, 10-in. sweep	.90
1 set Russell-Jennings auger bits	4.25
1 Rose countersink, ⅝-in	.15
6 hand screws, 8-in	1.70
6 hand screws, 12-in	2.40
1 pair winged dividers, 5-in	.20
6 half round wood files, open cut, 8-in	1.35
4 Maydole's hammers, No. 13	2.50
1 nail set, 1/16-in. point	.10
1 cabinet scraper, 3 x 5-in	.20
1 India oil stone, 7 x 2 x 1-in	.60
1 oil can	.10
1 smooth mill file, 8-in	.20
1 grindstone in wooden frame, 24 x 2-in	4.40
6 iron spoke shaves, adjustable	1.35
2 Buck Bros. tanged chisels, No. 2, ¼-in	.40
Total	$31.39

In any case, the teacher ought to be able to make some combination of the tables given here so as to suit the conditions under which he must work.

The figures given are not absolute, but may be taken as very nearly correct on the whole. The totals may be slightly reduced by special discounts on large orders.

In all cases, a high grade of tool is specified and quoted, as it is believed that, in the purchase of tools for this purpose, the best are the most economical. The cost of the equipment may be materially reduced by using a cheaper grade of tool, but this is not recommended.

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PARTICIPATION AND PRODUCTIVE LABOR IN GERMAN AND AMERICAN SCHOOLS.

FRANK A. MANNY.

THE American who studies German and French schools is impressed by the attitude of these peoples towards participation in processes. One meets with a remarkable provision for object lessons in the better equipped schools, but there is a conspicuous absence of opportunities for students to enter into other than visual relations with the objects. Initiative and self-activity are no more evident than they were in American schools of a generation ago. Dean Russell pointed out in his "German Higher Schools" that very often the few laboratories that he found were unused. During the last year I have visited several laboratories which showed little sign of wear after having been in operation a number of years. A few minutes with the program suggested the reason for this and consultation with science teachers confirmed the suggestion. In many cases the habit of the old scholastic method and philosophy had succeeded in practically controlling the newer materials and ideas, even as it did the new treasures of Latin and Greek after the first bloom of the Renaissance.

An extreme instance of this I found in an interview with the director of a *Realschule* in one of the larger cities. There chanced to be a workshop where apprentices were to be seen at benches and lathes in a building adjoining the school. I asked whether the workshop was connected with the school and received a very decided negative reply. Later I asked to see the laboratories when the director turned to me and said, "We have no workshops and no laboratories. In Germany these are intended for the training of those persons only who cannot escape manual labor." I am glad to say that this is not true of some of the schools.

But before the American takes too great pride in the extent to which his country has made use of these forms of experience in the education of non-manual workers, he ought to learn what he can for his country's needs from the splendid equipment that some German cities have made for trade and industrial training. Here is not the place to discuss this subject. I will only name a book which has appeared this spring by the leading exponent and demonstrator of this side of education, Dr. George Kerschensteiner of Munich, *"Grundfragen der Schulorganisation"* (Teubner, Leipsic). Through this work one will get into touch with

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the most definite statement I have found of the function of productive labor in education, from the social as well as from the physical standpoint.

I referred above to the similarity in some points between the situation as regards Latin and Greek a few centuries back and the newer subjects in some quarters today. But two important facts distinguish the modern problem from its predecessor, (1) Empirical science and philosophy have a very different standing and efficiency in this century. (2) There is a greater division of labor in the school world today than there was at that time. A mistaken habit in one continent can be corrected by better practice in another and *vice versa.*

One of the evidences of this more social development is to be found in the benefit that has come from the various international expositions. Indirectly, also, these have advanced the problems through the visitors who are brought to a closer study of conditions in a particular country after seeing the material exhibited.

One of the visitors to the St. Louis Exposition made a brief but very fruitful tour of our country and has embodied the results in a little book also published by Teubner. It is entitled "*Volksschule und Lehrerbildung in den Vereinigten Staaten*" and is by Dr. Franz Kuypers, director of the *Fortbildungsschulen* in Cologne. It is a thoughtful study of what our schools can contribute to present German needs. Naturally the interests of the author and the present status of our schools lead him to dwell particularly upon topics related to those I have referred to in this article. I give a translation of a few pages which may be of interest in showing how we appear to a careful, progressive, German schoolman. It is to be hoped that Dr. Kuypers will be led later to give us a work in which he will discuss German conditions and possibilities at first-hand.

I do not attempt to comment on what I quote from him. He may be extreme in some particulars but it is well to bear in mind that if, in the European schools, there is too much of the symbol and of *memoriter* work and too little of doing, it is quite possible that we, at times, become so absorbed in keeping pupils doing that we, too, fail in getting at the motive power, meaning, and so we do not come to real use.

Personal rights play a greater part in the political and social life of America than in any other country of the world. They were the chief factor in the history of the country, and national and local institutions, as well as all social and legal relations, are based upon these same rights. No wonder then that the idea exercises a decided influence in the school. The American system

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of instruction takes into consideration to an extraordinary degree the inclinations of the child. This tendency may be traced from the play things in the kindergarten to the elective courses of study in the higher institutions of learning.

In the elementary school this adaptation of instruction to the needs of the child appears conspicuously in his participation in the process. It does not consist in merely looking at pictures, apparatus and other means of illustration, but much more in explanation by means of drawings. The picture is not hung before the pupils, it is developed in their presence. The school meets the native activities of the child in a remarkable way and for that reason prefers that the pupil should make his own observations.

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Thus there arises a method of doing, as it were, a sort of process which even in purely theoretical branches, if one can speak of such in America, requires a physical activity in connection with the mental. This reaches a climax in the manual training lessons where the pupils construct by means of tools the objects which have formed the subject of instruction.

* * * * * * * * *

The tendencies of the child are naturally toward breadth rather than depth and so too the instruction. It is suggestive and many-sided rather than exhaustive. The principles, 'from the easy to the difficult', 'from the simple to the complex' are subordinated to the effort to interest—one might sometimes say, to amuse.

Through the disregard of the didactic principles just mentioned, Young America, who aspires to the new and the great, more than the European youth, is given tasks which a systematic pedagogue of the old world would precede by a well ordered series of preparatory exercises. Furthermore, the American would lack the whole scale of formal steps and also the all-round working out of the subject and the drill; to be sure, on the other side, he lacks the weariness.

A happy venturesomeness without overlong deliberation and analysis—a quality which must have inspired the whole people, when they were bringing their vast country under control—appears also in the school system. That which is very soon made clear to the foreigner on the streets and railways, is also found in the school classes,—self-reliance and no dependence upon leading-strings or guardianship from others. A desire for novelty and the self-help (*Selbsthilfe*) of youth are necessarily accompanied by superficiality. Even this happy school dilettantism is the outcome of the restlessness of the entire people, to whom speculative or profound deliberation is foreign. The instruction therefore will be absolutely nothing else. It follows naturally then that the school cannot impart an organically related and united store of knowledge, but it stimulates the young citizen and shows him the path which he can follow later by himself.

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What I have seen in general of pictures for illustration, maps, physical and other apparatus—apart from stereopticons—was very meager compared with what the German exhibition offered and what is found in our city schools. * *

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One can see that it is not due to economy merely if in other schools (than the manual training high schools) less illustrative material is to be found; for here in the room for woodwork, the smithy, the foundry, and the machine shops, the fortunate boys have the use of a mass of material for which thousands of dollars have been paid. And they are materials not to be looked at merely but to be actually used.

The Americans never tire of praising the bright side of such a training. The real or supposed advantages may be summed up as follows: physical; adroitness, a strengthening of the nerve and muscle forces; social; the equal claims of physical and mental labor and an understanding of their economic values, the possibilities of adorning the home one's self, an introduction to frugality; intellectual; a training for clear definite expression and a quick and exact carrying out of ideas, a knowledge of tools, adaptation of form and matter; ethical; the forming of habits of exactness, attention, reflection, the employment of time in useful occupations, character building through productive labor, a strengthening of confidence in one's own ability and a feeling for the beautiful. Such pupils as show little inclination or ability for theoretical instruction can be interested in this way and gradually led to the other subjects. Finally, a practiced eye and a practiced hand are a better equipment for industrial life than the memorized knowledge of many secondary matters. "Learning by doing" should complete the dull theory of book knowledge.

The necessity of forming one's own world in the solitudes of nature or among a wild confusion of strange peoples and conditions has led this new nation to an educational ideal which approaches in a remarkable manner the old Hellenic ideal of beauty—the harmonious development of physical and mental power.

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THE INTERNATIONAL FEDERATION FOR THE TEACHING OF DRAWING AND THE PROMOTION OF ART EDUCATION.

SOLON P. DAVIS.

THE third international congress for the advancement of drawing and art education is to be held in London in the month of August, 1908. The first international congress on art education was organized at the Paris Exposition in 1900. Its success, and the interest shown by the several countries represented, led to a second convocation at Berne, Switzerland, in 1904. At this meeting a permanent organization was effected. The representatives from the United States and the art educational exhibits from Boston, Springfield, New York, Pratt Institute, Teachers' College, The Massachusetts Normal Art School, the State Normal at Hyamis and other places, won for this country a strong position; in fact, many European educators conceded to America the leadership in elementary art education, and the exhibits were loaned, upon request, to several foreign countries. It should be said, however, that the organization of the exhibition at Berne was not such as to make it thoroughly representative of any of the countries participating, and that a comparatively small number responded to the invitation to exhibit work from their respective schools.

Preparations for the coming Congress are on a much more comprehensive scale and there is every reason for alert and patriotic interest on the part of American educators in order that the United States may be adequately represented at London.

The American Official Committee, Mr. James Hall of New York, chairman, and the Advisory Committee appointed by that body, began work upon the problem a year ago and have been assiduously urging the enterprise forward.

A co-operating Committee of One Hundred has been organized to assist in raising the requisite funds for the exhibition proposed, the publishing of a conspectus setting forth the history, present aims, statistics of the movement in this country, and the arousing of wide interest in the coming meeting at London. This committee includes representative educators from all parts of the country in art educational lines.

The Official Committee for America appointed by the Congress at Berne is as follows:

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American Official Committee.—

James Hall, Chairman. Director Art Department, Ethical Culture School, 63d St., and Central Park West, New York City.

Chas. M. Carter, Director Art Education, Denver, Colo.

William Woodward, Prof. of Art, Newcomb College, Tulane University, New Orleans, La.

Advisory Committee.—

Solon P. Davis, Hartford, Conn., Chairman of the Co-operating Committee of One Hundred.

Mrs. Matilda E. Riley, St. Louis, Mo.

Miss Wilhelmina Seegmiller, Indianapolis, Ind.

Miss Mary C. Wheeler, Providence, R. I.

John S. Ankeny, Jr., University of Missouri.

Henry T. Bailey, Secretary, North Scituate, Miss.

Cheshire L. Boone, Treasurer, Montclair, N. J.

J. Frederick Hopkins, Baltimore, Md.

Leslie W. Miller, Philadelphia, Pa.

Walter S. Perry, Brooklyn, N. Y.

Walter Sargent, Boston, Mass.

James P. Haney, Chairman Sub-committee on Publication, New York City.

These committees have decided on the following plan of representation:

1. A national representative exhibit of work in drawing, design and handicraft from all grades of public schools, colleges and industrial art schools, to present clearly the American ideal.

2. A conspectus of American art education; a volume containing a sketch of its history, an outline of its philosophy, a statement of its organization, equipment and methods and a table of statistical information.

To gather, classify, mount, label, ship, install, guard and return this exhibit, and to collect the required information, print and distribute this volume will demand a working fund of several thousand dollars.

A gratifying interest is being shown in schools throughout the country and readiness to help is evinced by replies to the invitations to take part in the exhibition, various enterprises to secure contributions to the fund for the prosecution of the work, and inquiries regarding arrangements for travel, accommodations at London, etc. It is confidently expected that many educators interested in this phase of instruction will

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avail themselves of the opportunities offered by the Congress. Arrangements for travel, accommodations, etc., are in competent hands and public announcements regarding them will be made at the earliest possible date.

Mr. Henry T. Bailey, who was the delegate of the American Official Committee at the recent meeting of the International Committee at London, is authority for the statement that Dr. Henry T. Lund, who has in charge the securing of reduced rates of travel in England, is very sanguine as to the outcome; these rates may be reduced one-half in favor of the members of the Congress.

Several parties will be organized to visit various European countries and to arrive in time for the Congress, under the auspices of the Bureau of University Travel, and others will be conducted by individual teachers of experience, such as Professor William Woodward of New Orleans, and Professor Arthur H. Chamberlain of Pasadena. After the Congress, excursions will be arranged into Scotland, Wales and Ireland and it is hoped that all American teachers may return by the same ship reaching New York on Labor Day, 1908.

Mr. Bailey's report of the London Conference is substantially as follows:

A meeting of the members of the Committee of the International Federation was held at the Royal College of Art, South Kensington, London, August 3d, 1907. England was represented by the Rt. Hon. Sir John Gorst, K. C., Mr. J. W. T. Vinall and Miss Ethel M. Spiller; France—Messrs. Guebin and Francken of Paris, and Mlle. Truffot; Germany—Prof. Dr. Kerschensteiner of Munich and Herr Gotze of Hamburg; United States—Mr. Henry T. Bailey, Boston; Bulgaria—Mr. Palacheff; Russia—Miss Palivanova of Moscow; Canada—Prof. Armstrong of Toronto.

The Third International Congress will probably be held during the week of August 3d, 1908, final decision in the matter being left to the British Committee. The reasons for placing the Congress so early in the month are: that certain influential people would then remain in London to participate in the Congress; the annual exhibition of the drawings from the British art schools entered in the national competition will then be on view; the Anglo-French exhibition at Earl's Court, in which all the art and technical schools of France will be represented, will be open to members of the Congress; and the annual exhibition of the Royal Acadamy will not have closed. The exhibition of drawings, etc.,

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in connection with the Congress will be open a week or two earlier than the Congress and close a week or two later.

All the papers will be printed in the final report of the Congress. A resume of each paper will be printed in the three official languages upon slips for distribution immediately preceding the delivery of the paper. The papers so far as possible will be illustrated by means of charts, prepared in advance, or by means of blackboard drawings made at the time of delivery.

The program of the Congress will be run as a whole without sections. The sessions are to be held on Monday, Tuesday, Wednesday and Thursday from 10 a. m. to 1 p. m. only. This will leave the afternoon and evening of each day free for the inspection of the exhibits, for receptions and entertainments and such excursions as may be planned by the British Committee. Friday is to be a free day, during which if groups of especially interested people wish to discuss certain questions which the previous sessions have raised, free discussion of these questions may be had without interfering with the regular program of the Congress.

Provision will be made for a wall exhibit and for the display of handicraft and bound volumes of class work upon tables immediately beneath the wall exhibit. It is planned that each nation shall provide for interpreters to be present at certain specified hours to answer questions concerning their exhibits, in German, French and English, at least. It was voted that the color, size, and arrangements of mounts and the character of the labels be left to the decision of the British Committee. After the meeting the principal member of that committee requested that the American Committee plan its exhibit according to its best judgment, submitting a diagram of its arrangement, including explanatory sheets and labels, that the British Committee migh recommend that arrangement to all other exhibitors.

The American plan for a representative national exhibit, supplemented by special exhibits, from the more important institutions, was highly commended, and recommended to the attention of other nations.

Sir Aston Webb, the architect of the new buildings for the Royal College, has promised the British Committee to do all in his power to have one floor ready for installing of the International Exhibition on June 1st, 1908.

Upon recommendation of the American delegate, it was voted to invite the British Publisher's Association to organize a trades exhibition

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to be held at the time of the Congress and to invite art educational dealers in other countries to contribute; the management of this exhibition to be entirely distinct from that of the Congress itself.

Sir John Gorst announced that the British Government had consented to transmit through its Foreign Office invitations issued by the Duke of Devonshire to other governments, to co-operate so far as possible in recommending delegates to attend the Congress.

During his visit to England, Mr. Henry T. Bailey secured interviews with a number of prominent artists and critics, among whom were Messrs. Walter Crane, Edward F. Strange, Richard G. Hatton, Alexander Fisher, and E. T. Ewen. They all promised to co-operate heartily to make the Congress a success and to take part upon the program upon receiving an official invitation from the British Committee.

Germany will make the strongest possible showing at the Congress (having an additional incentive in the Anglo-French exhibition to be held at Earl's Court at the same time). The French will have a creditable showing in addition to the complete showing to be held at Earl's Court. M. Guebin promised to urge Prof. Hists (one of the best demonstrating teachers of art in Paris) to appear upon the program.

A local treasurer has been appointed in each nation to represent the British treasurer. Mr. Cheshire L. Boone, Montclaire, N. J., was elected local treasurer for the United States.

Any evidence of interest in the success of the Congrss, on the part of American educators will be cordially welcomed by the Official Committee.

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THE LEARNED YOUNG PEDAGOGUE AND THE WISE OLD MAN.

A FABLE[1].

Once upon a time many children were gathered together in a big school building in a city by the river. And there came to this building from a city by the sea a young man to teach the boys the art of working in wood. Now this young man had made his grades in a famous school where psychology is taught, and was, therefore, reputed to possess great pedagogical skill.

One day a wise and kind old man with silver grey hair came with joy to this school to see the learned young man teach the boys. No sooner had he entered the workroom than he saw a sketch upon the blackboard in front of the class which surprised him greatly. Instead of being well drawn, it was ill-proportioned, the lines were ragged, and the figures uncomely. Indeed, the whole seemed so unworthy of a man of much learning and skill that the kind old man could scarce believe his eyes.

In order to relieve his mind of this burdensome thought, he said to the learned young teacher, "Who made that drawing on the blackboard?" "I did," said the teacher. "What!" said the kind old man, now more disturbed than ever, "Can't you make a better drawing than that?" "O yes, certainly," was the reply, "but I didn't want the boys to imitate my drawing, and so I just made that rough sketch. I expect them to make good drawings."

The old man was undone, for he had thought highly of the young teacher. A cloud passed over his kindly face, and then drawing himself up to his full height he said firmly but kindly, "Young man, don't you know that the boys are sure to imitate your drawing whether you want them to or not?"

Moral: Untwist your psychology before you apply it.

C. ALPHEUS.

[1]If this were fiction the author would doubtless declare it to be fact, but since it is fact he merely insists that it is pure fiction.

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EDITORIAL

Skillful Expression in School Arts

The formal school arts work of a few years ago had at least the virtue of demanding of the pupil a high order of skill in execution. In the transition from this formal work to a freer expression, the tendency has been to discredit skillfully executed work and to lay all of the stress upon the originality of the thought involved. The early work carried the demand for skill to the extreme; in the later work skill has been overshadowed by the emphasis given to originality. The result is that freedom often becomes license and our school arts departments are responsible for an appalling amount of work that is poor in design and atrocious in execution.

Such a situation has no parallel in other school subjects. In every department of work originality is emphasized, but the best expression of which the pupil is capable is demanded. In number work, absolute accuracy is the standard. In penmanship, neatness and legibility are insisted upon. In spelling, reading, grammar and language, the pupil is urged to the highest possible degree of attainment. Criticism, suggestion, correction, every device of the skillful teacher is used to inspire him to the highest ideals. The capacity of the teacher is very largely measured by the standard of ability to lead the pupil to thoughtful, accurate, methodical expression. Loose, careless, unsystematic methods are always the mark of the inefficient teacher, and their results are always manifest in the pupil.

It is claimed by extreme advocates of free expression that interest is diminished by insistence upon careful execution. As a matter of fact the pupil feels the deepest interest in his work only [illegible] the result is good and satisfying to himself and this interest is i[illegible] he realizes a growth of power to express himself with grea[illegible]terest and originality are vital factors in the development [illegible] but they reach their greatest possibilities only when though[illegible]l towa[illegible] high standards. Undirected or misdirected, the[illegible]ught[illegible] careless, slovenly habits in expression and in livin[illegible]

Aside from the purely educational aspect of th[illegible] har[illegible] less important practical r[illegible]or development in[illegible]arly[illegible] the higher grades. Th[illegible]strial problems o[illegible]apid[illegible] becoming a matter of [illegible]n to educators,[illegible] pe[illegible] sistent demand for prac[illegible]m the public[illegible]

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Pedagogically there is no warrant for a distinction between ideals in school arts and other school subjects. The standard by which all of the work of the pupil should be measured is the best that he is capable of doing. His thought should have his best expression, or it fails of its highest possible influence on his life and character. —R.

The London Congress We are glad to call special attention to the article in this issue on the International Congress which is to convene in the city of London during the early days of August, 1908. This congress will undoubtedly be the greatest meeting ever held in the interests of the teachers of drawing and manual arts. More forces and stronger ones than ever before are co-operating to this end, and in this connection it is a matter of no small concern to America and American teachers that their representatives are taking an important part in this great enterprise. Every patriotic American teacher of the manual arts should find reason for gratification in this fact and lend his hearty support. Surely, all must recognize the wisdom in the plans of the American committee in organizing a representative exhibit and in setting forth American ideals in an adequate publication.

From one point of view it is unfortunate that the United States government does not help in this enterprise by placing a liberal appropriation at the disposal of the American Committee. On the other hand, the fact that five thousand dollars, or more, necessary to the successful consumation of present plans must be voluntary contributed by teachers and their friends makes for a more vital interest in the Congress and, therefore, insures a more truly representative exhibit. The undertaking is one that every teacher may be glad to have a share in.

Milwaukee's Public Trade School About two years ago the Merchant's and Manufacturer's Association of Milwaukee established a trade school under the immediate direction of Charles F. Perry, whom they called from the engineering department of the University of Illinois. Classes were organized in several of the machine and building trades which were successful from the first. In a very short time the school had grown to such large proportions that it became impossible for the Merchant's and Manufacturer's Association to support it. Through the efforts of its members a bill was introduced in the State Legislature making it legal under certain conditions for public funds to be expended for the support of trade schools. This bill was received with great favor by

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all parties in both Houses, and was gladly signed by the governor. The city of Milwaukee immediately seized its great opportunity to take over the entire plant of the Trade School, and it is now included in its public school system. Nearly every department of the school is now running at full capacity. The bill making this possible contains so much of general interest that it has been published in full in the third Bulletin of the Society for the Promotion of Industrial Education.

Charles H. Morse, secretary of the Massachusetts Commission on Industrial Education is reported to have made the following statement:

"Out of 2078 boys of eighteen or nineteen years of age, none of whom knew a trade, who have recently applied to the state employment bureau for positions, over eight hundred testified that had the public schools furnished education in a trade they would not have left school as they did at fourteen or fifteen."

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ASSOCIATIONS

WILLIAM T. BAWDEN, Editor.

HAMPDEN COUNTY TEACHERS' CONVENTION—HELD IN SPRINGFIELD, MASS., OCTOBER 18, 1907.

Re-written from report in the Springfield Republican.

Miss Virginia Graeff of the Wheelock Kindergarten Training School, read a paper before the primary section on "Kindergarten and School Handicraft as a Preparation for Later Industries." Principal Clarence A. Brodeur of the Westfield State Normal School presided. The greater part of Miss Graeff's paper was devoted to explaining the technic of kindergarten and the work in the lower grades, and to showing how waste material in the homes, such as pasteboard boxes and pieces of wall paper, can be utilzed. Excellent specimens of this kind of work, found in different parts of the country, were used to illustrate her point. She laid special emphasis on the fact that children must begin handwork early if skill is to be developed, and explained how the work in pasting, binding, etc., will help the large field of industry in which that work is done.

M. W. Murray, director of manual training in Springfield, took up the discussion, emphasizing the educational value of handwork, and went on to point out the fact that manual training falls short of doing what it should for the boys who need it most, showing that they never go far enough in the grades to get the work which would be of the greatest benefit to them. Mr. Murray said:

If we consider manual training from an industrial point of view, we shall find that many of the boys who need it most, either get none at all, or so little that it falls far short of filling the place in an educational scheme which it seems to me it should fill. We all know the boys who are not by nature fitted to sit at a desk all day and pore over an abstract task. They not only are not fitted to do it but they will not do it, and they wait impatiently until they are 14 years old, when they leave school. Teachers are likely to call these pupils stupid and say that while they might do something with their hands, they cannot with their brains, when it is often a fact that they have as much real brain power as have their teachers, only of a different kind. It is like driving a square pin into a round hole to try to educate these boys through books alone, and it is positively wrong to drive them from school by trying to give them something which they cannot and will not take, when we might give them work for which they are better fitted and which would enable them to earn a better living when they leave school. This can be done by giving them the maximum of mechanical work and as much academic as we can get them to take. It may be said that these are just the pupils who can least afford to take the time from the three R'S. In reply, I would say that the great majority of boys below the seventh year in school who are from 14 to 16 years old, are merely "marking time," and if

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they give half of their time to a well planned mechanical course, they will be sure of so much of real worth, and in connection with it, they can not help getting some reading, writing and arithmetic. The other half of the work should be planned with direct reference to the problems which are being carried on in the shops. From my experience with hundreds of motor-minded boys, I feel sure that this is the only way to reach them. The statistics taken in the Springfield Evening School of Trades seem to me to go a long way toward proving that at least from 55% to 66% of our mechanics never go beyond the seventh year in school.

Last February, we examined 193 boys in the Springfield schools between the fourth and eighth grades, not including the eighth grade, who were within a month of or over 14 years of age. I wished to determine how many of these boys "wanted to go to work;" and if possible, to find out if it was a financial necessity that they leave, also if they would stay in school if they were given a kind of work which would enable them to go out and take a better position in the industries. Of the 193, 104 wanted to leave or would soon do so; five were doubtful, and 84 wanted to remain in school. Of this last number, quite a few thought that they would like to remain in school longer if they could enter the Technical High School.

This investigation simply confirmed my long-standing belief that these boys should have a special course of work planned for them, to include boys from the 14th to the 16th or even the 18th years. It has been clearly shown that these years are practically unproductive to both employer and employed. Any city the size of Springfield could, and I believe should, support a school of this kind, where the work for these boys would be at least half shopwork and mechanical drawing, and the rest of the time devoted to what are considered the essentials. Such a school need not teach any particular trade, but should give the fundamentals of several trades and make the boys generally efficient in a mechanical way, so that at the end of three or four years, they would be more valuable to themselves and to their employers. In the last number of "Charities and the Commons" there is an abundance of material which it seems to me should convince any sane person of the reasonableness of providing for these boys, who now leave school, the things which they need and want to know, and of the fact that they do not leave because of financial necessity. Dr. Kingsbury, who conducted such a thorough investigation for the Massachusetts Industrial Commission, writes as follows:

"I believe our interviews give ample proof that two distinct agencies are at work impelling the child to withdraw from school—the positive dislike for books which comes at the stage of development when it is the tendency of the child to do and not to study, and the ineffectiveness of the school to meet that demand of the child; and the desire to follow 'all the other boys.'

"The appearance of home, of mother, of children, confirmed by statement of parent, and proved by calculation of income and expenditure, leads us to feel confident that three-quarters of the families could, yes, and would permit their children to continue in school, if we could only convince the child."

"The parent did not want the child to leave school; the child left from choice. The parent is now expending as much on music lessons and commercial

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schools as the child nets to the family over and above carfares and extra clothing, ice cream sodas and other amusements."

"A large majority of parents could and would afford Industrial Training for their children." (Based on attitude of 3,157 families.)

"76% of these families could give their children Industrial Training." (Based on the family income per person being more than $2 per week exclusive of rent, and on apparent conditions.)

"66% of the children could have continued in school." (Based on statement of parents.)

"55% of the families declared they would send their children to trade schools."

The mistaken belief is still held by a great many people that the technical, mechanic arts or manual training high schools are training for the trades, when the statistics of occupations of graduates from these schools show that only a very small percent become mechanics and that those who do enter industrial establishments become foremen, superintendents, etc., and the rest go on to higher engineering schools or enter the so-called learned professions. The same number of "Charities and the Commons" from which I have quoted before contains the following statement by Prefessor Hanus:

"The manual training high schools—or so-called technical high schools—intended originally to train recruits for the trades— are really in most cases institutions for general education, like the academic high schools; but unlike them, they serve to give a certain class of pupils a general high school education with the help of manual training, or like them, to prepare their pupils for higher training in some college or engineering school."

There is something decidedly wrong with a school system which allows such a large number of pupils to leave school, and it seems to me that the time has come when the grammar schools should cease merely to prepare for the high school and the high school for college.

The Cleveland Manual Training Club held its first meeting of the season Friday evening, November 1st. Supper was served at 6:00 o'clock, followed by the annual business meeting and the election of officers. George A. Seaton, of Shaw High School, East Cleveland, was elected president for the ensuing year; E. H. Masters, South High School,Cleveland, secretary; and S. O. Champion, supervisor of manual training, Lakewood, treasurer. These officers constitute the executive committee.

The program of the evening consisted of an address by James F. Barker upon Industrial Work in the Schools of Germany, followed by personal experiences of the various members who had attended summer school the past season.

The Society for the Promotion of Industrial Education will hold its second annual meeting in Chicago, January 23-25. Here will be gathered manufacturers, trades-unionists, and educators to discuss the present problems of industrial education. An exhibit is being planned under the direction of Secretary Morse of the Massachusetts Commission.

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ILLINOIS STATE TEACHERS' ASSOCIATION.

The County Superintendents' Section of the Illinois State Teacher's Association has a standing committee on course of study for the common schools. During the past year their fourth general revision of the course has been completed and recently published by C. M. Parker, of Taylorville. This course is copyrighted by the County Superintendents' section, but through the kindness of Charles McIntosh of Piatt County and Mr. Taylor, the publisher, we are permitted to reprint the outline on woodworking. We do this because we believe that the movement toward better organization of the manual arts work in the schools of Illinois is of general interest throughout the country, and because this outline is to be one of the subjects for discussion at the next meeting of the Illinois Manual Arts Association. This outline was prepared for the state course by the following committee; Charles A. Bennett, Peoria; William T. Bawden, Normal; Ira S. Griffith, Oak Park; Seymour L. Smith, Dekalb; and L. H. Burch, Macomb.

WOODWORKING.

The outline given below is intended to be suggestive merely. It is not ideal; it is not even the best that could be devised to meet conditions in any given school. The most that can be hoped for it is that it may lead in the right direction and be within the realm of practical possibility so far as it goes.

Any course in woodworking worthy of a place in the eighth and ninth years of public-school work should meet the following requirements:

1. It should arouse and hold the interest of the pupils.
2. Correct methods of handling tools should be taught so that good technique may be acquired by the pupils.
3. The tool work should be accompanied by a study of materials and tools used and their relation to industry. Special attention should be given to the study of trees—their growth, classification, characteristics and use.
4. Drawing should be studied in its relation to the work done.
5. The principles of construction in wood should be taught through observation, illustration and experience.
6. At least a few problems should be given which involve invention or design or both, thereby stimulating individual initiative on the part of the pupils.

The first course outlined below is intended for the grammar grades, the second for the high school. Both courses are arranged in groups, each group representing a type of work. These groups are given in the order of procedure in the course, though some variation from this order might prove equally good. The order given, however, has been found satisfactory. The problems named have been tested by use under a variety of conditions, but are not essential to the plan of the course. Each teacher should seek to provide problems of the greatest possible value educationally. This means that the things made should be worth making and that the process of making them should be interesting to the student. And from this, it follows that the things to be made must come to the pupil in an order which gives reasonable consideration to the difficulties to be encountered in making them. But the course should not be slavishly followed. It should be kept flexible enough to meet the needs of the several individual

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pupils. After the first three or four groups have been completed each individual pupil may be encouraged to provide his own problems. These would be something he has invented or designed or selected to make for a definite use.

GRAMMAR SCHOOL COURSE.

From 90 to 120 minutes a week for 36 weeks, or about 60 hours.

GROUP.	PROCESSES.	PROBLEMS.
I. First use of saw and laying-out tools (stock machine planed when given to pupil).	Measuring. Squaring. Gaging. Sawing. Boring. Making dowel.	1.—Marble Bridge. 2.—Game Board, or Counting Board, or Laundry List.
II. First use of the plane (stock in the rough when given to the pupil).	Planing smooth surfaces. Planing— (a) Side. (b) Joint edge. (c) To width. (d) To thickness. (e) Block-planing ends. (f) Chamfering.	3. Swing Board. 4. Chiseling Board, or Solitaire Board, or Hat-rack, or Plant Marker, or Specimens of Native and Commercial Woods, or Kite Sticks.
III. First use of spoke-shave and turning saw. Laying out curves.	Sawing curves. Modeling with the spokeshave. Sandpapering.	5. Coat hanger, or Bow, or Whisk-broom Holder.
IV. First use of chisel.	Vertical chiseling. Paring. Gouging. Sharpening chisel.	6. Bread-cutting Board (with semi-circular ends) or Sleeve Board, or Tray, or Broom rack, or Sail boat, or Back for mounting specimens. 7. Flower-pot Stand, or Foot for Christmas Tree, or Weather Vane, or Picture Frame.
V. Construction of objects by means of some form of the groove joint or the butt joint.	Housing. Halving. Nailing. Gluing. Carving. Finishing.	8. Book-rack, or Bracket-shelf, or Sled, or Box-trap, or Glove Box, or Small Hand Loom, or Plant Stand, or Plate Rack, or Water-wheel, or Windmill, or Tackle Box, or Clock Case, or Foot-stool.

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HIGH SCHOOL COURSE.

Five 60 minute periods or four 75 minute periods a week for 36 weeks, or 180 hours in all.

GROUP.	PROCESSES.	PROBLEMS.
I. Review. Review of planing, sawing, squaring, gaging, chiseling, etc.	Making butt joint. Planing a cylinder. Use of screws.	1.—Tool-box, or nail-box, or window-box for flowers, or bench hook. 2. Towel roller.
II. More exact work in planing to make a glue-joint.	Gluing. Planing joints. Clamping. Surfacing.	3. Drawing Board with or without Tee-square.
III. Construction by means of mortise-and-tenon joint.	Laying out duplicate pieces. Cutting mortise. Testing mortise. Sawing tenon. Gluing and clamping. Scraping. Weaving Split Cane. Finishing.	4. Taboret, or Book shelves involving keyed construction. 5. Stool, or Seat, or Chair with cane top.
IV. Construction involving the miter joint.	Designing a frame for a given picture. Planing parallel edges and sides in the construction of a miter-box. Rebating. Sawing the miter-box. Laying out and cutting a brace.	6. Framing a picture. Note: At this point in the course, instruction may be given in the use of the carpenter's square in laying out and cutting braces and rafters.
V. Construction involving the dovetail joint.	Laying out and cutting dovetails. Planing corners. Inlaying. Finishing.	7. Tool-chest or Treasure-box. or Drawing Instrument Box, with or without inlaid design on the top.
VI. Construction involving the panel.	Planing. Fitting. Gluing. Clamping. Putting on hinges. Finishing.	8. Screen, or Music Cabinet, or Plate-rack, or Bookcase, etc.

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The fifth annual meeting of the Illinois Manual Arts Association will occur at Bradley Polytechnic Institute, Peoria, Friday afternoon to Saturday noon, February 7-8, 1908. Problems of courses of study for the elementary schools are to receive special attention. The Annual Banquet will be served by the Department of Domestic Economy at Bradley Institute. Copies of the printed program will be available about January 1st upon application to the Secretary.

The Executive Committee of the Western Drawing and Manual Training Association has decided upon April 8-11 as the date for the coming meeting at Indianapolis. The committee has also decided to publish a bi-monthly bulletin until the meeting. The first was issued in October and can be obtained on application to the secretary R. A. Kissack, Yeatman High School, St. Louis, Mo.

The Kansas Manual Arts Association is planning a meeting at the holidays in conjunction with the Kansas State Teachers' Association at Topeka.

The Pacific Manual Training Teachers' Association will hold its first meeting for the year some time in December.

The Manual Training Section of the Southern Minnesota Teachers' Association will hold a session on Saturday, November 2, at Mankato.

A feature of the Northwestern Iowa Teachers' Association was a round table manual training discussion on October 25th, conducted by A. B. Roy, of Onawa.

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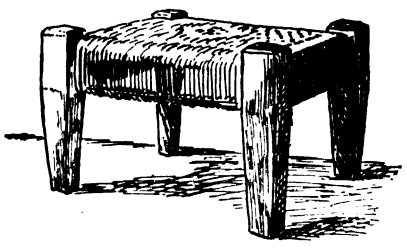
SHOP PROBLEMS

GEORGE A. SEATON, Editor.

SMALL WALL CABINET.

As an example of cabinet construction the small wall cabinet made in Mr. Weick's classes at Columbia University furnishes an interesting illustration. Considerable opportunity for choice on the part of the student is offered as the dimensions given are merely suggestive. Ordinarily the necessary stock is issued to the students and they are allowed to cut it down to suit their own ideas, the only point insisted upon being the method of construction. The shaping of the bottom of the sides and the corner blocks can be made a problem in design, while most interesting of all is the designing and making suitable hinges and door pull or escutcheon from sheet brass. If care is exercised in the design, it will be found possible to make the hinges with the simplest of tools. A point worthy of notice in this model is the use of re-inforcing corner blocks at every opportunity. Small triangular blocks, not shown in the drawing, may be used inside of the cupboard, and if sawed of the right length will serve as a stop for the door. The tongue on the door rails is made just long enough to fit into the panel groove on the stiles. To strengthen this joint two quarter-inch dowels are used at every corner.

SIMPLE STOOL.



A stool which will prove very pleasing but which is so simple that it can readily be made in the eighth grade or possibly in even lower grades is shown in the first drawing. By the use of dowel rods for the cross strip it is possible to do away with the customary mortise and replace it with a simple bored hole. The top is woven from what is known as binding which comes in long twists like rattan and is pulled out in the same way from the loop end. One twist is sufficient to cover three stools and costs thirty-five cents. The winding should be completed lengthwise first and should not be drawn absolutely taut as the cross weaving tightens the work considerably. The design can be worked out in the cross weaving and may be any of those adapted to "under and

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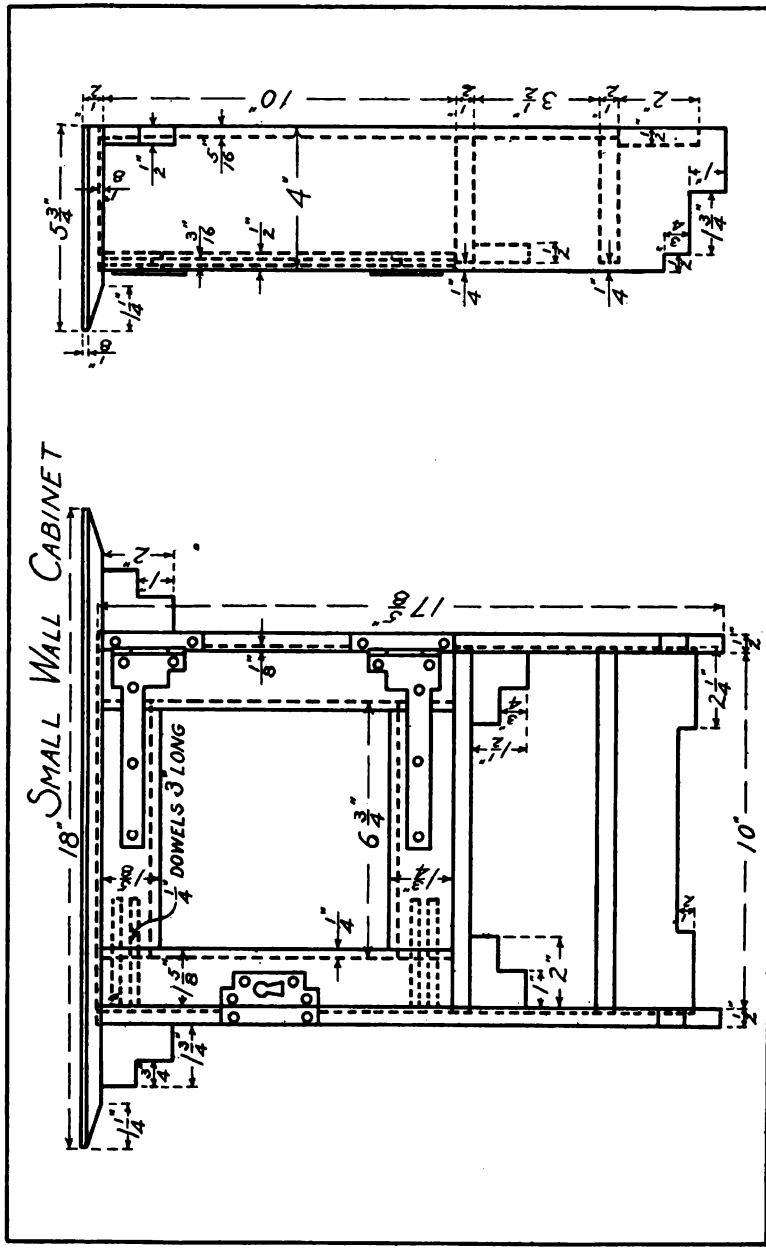

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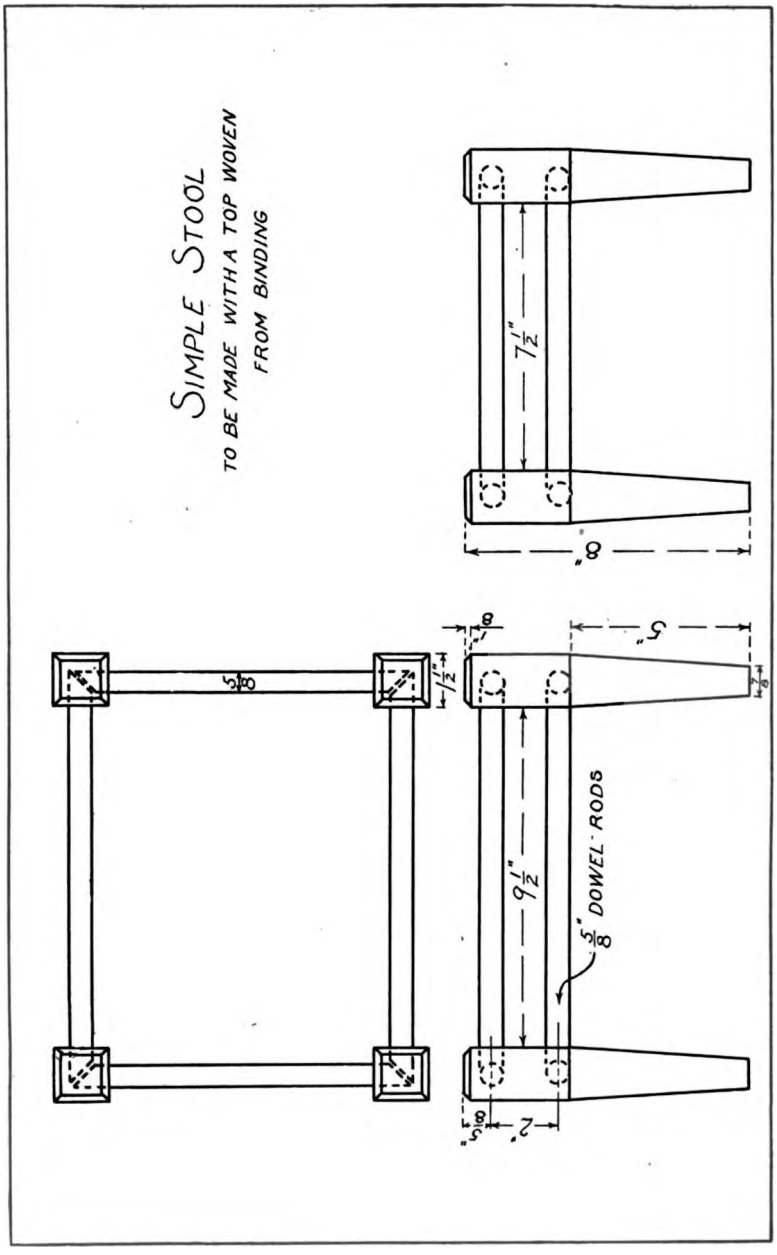

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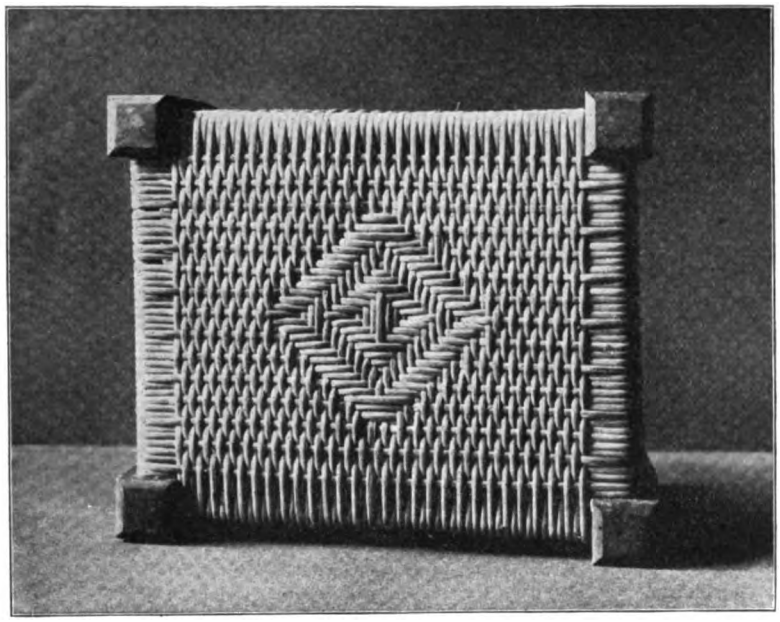
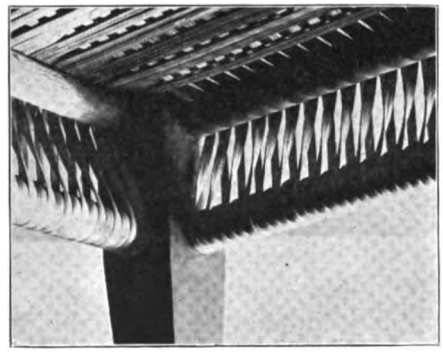


CROSS WEAVING DESIGN FOR STOOL.



SHOWING THE METHOD OF WEAVING THE SIDES.

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over" weaving. No needle is necessary and the binding may be used without any preliminary soaking. Splicing is done by the use of small brass rings. For stronger workers what is known as very fine cane makes a satisfactory seat and rush can also be used with success. The material can be purchased from the United States Rattan Co., Madison and Eleventh Street, Hoboken, N. J., or from the American Reed Co., Kingsland and Norman Avenues, Brooklyn, N. Y.

INDUCTION COIL.

The induction coil shown was also submitted in a Manual Training Magazine competition and gained for Mr. Ira S. Griffith, of Oak Park, Illinois, third prize. Concerning it Mr. Griffith says: Experience has shown that pupils of grammar grade and high school are alike interested in electricity, a passing interest, perhaps, on the part of most of them, but none the less intense while it lasts.

The induction coil shown in the drawing was constructed by two grammar-grade boys. Their knowledge of the principles involved was obtained by outside reading and the materials used were of the "pick-up" variety. The expense was practically nothing and the assistance received a like quantity. The machine was a success in every way.

One of the boys, though now not much more than a boy, is chief electrician of the city street railways of one of Illinois' largest towns. This was his first electrical work, and the inventiveness and perseverance required on this first piece are just the qualities, now well developed, which have enabled him to bring his road from one of second rate importance to one of the best, if not the best, in his state.

While this problem has been successfully worked out in the grades, its best place will be found in the high school metalworking course where filing, soldering, turning and founding may be combined with a fuller knowledge obtained from the study of physics.

The base is of soft pine. The beveled oblong bread cutting board is often used by our boys for such a base. The binding posts are shown in the drawing as passing through the board so that the connections shown by dotted lines, may be placed in grooves cut on the under side. These binding posts are stock articles now and may be bought in any size and style. The original machine had for binding posts the brass end fasteners from sash curtain rods.

The current breaker was cut from the soft tin of an oyster can. One end was soldered to the head of a machine screw and to the other end was soldered a piece of soft iron got at the blacksmith's. This breaker could well be made of sheet brass, though the tin answered the purpose.

The ends of the spool for the coil were of thin whitewood. Besides the holes for the core there were two small holes in each end through which the current wire made entrance and exit. These end pieces were fastened to the ends of a hollow paper cylinder by means of glue. This cylinder was made of layers of coarse wrapping paper cut to a length and wrapped around a lead pencil and pasted so as to make it stiff and strong

The primary was wound with two layers of No. 12 gauge induction wire, the ends extending through the wooden end pieces. A layer of paper was

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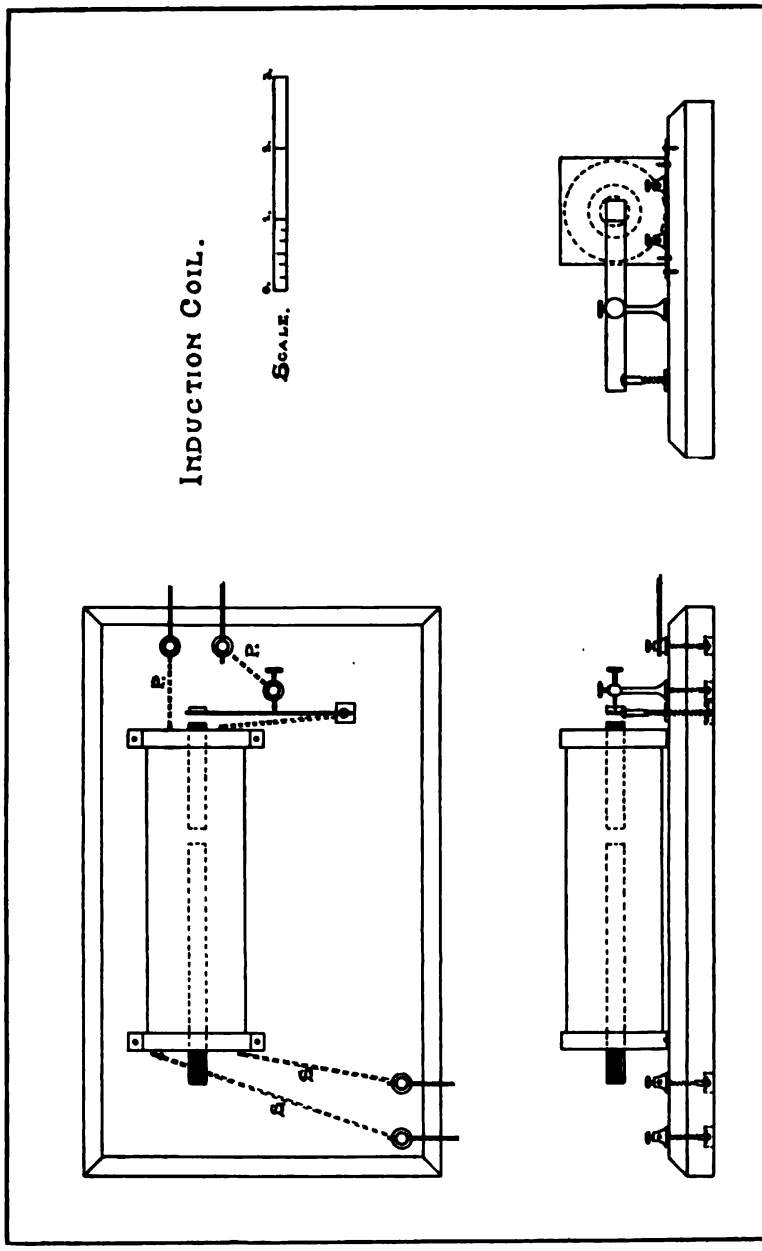

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wrapped around this coil before a secondary of No. 40 gauge induction wire was wound. A piece of paper was wrapped about every second layer of the secondary coil. The secondary coil, after being wound, was neatly covered with brown paper pasted in place before the coil was fastened to the base. The core was of soft iron wire in two parts as shown on the drawing, that the strength of the current may be regulated thereby.

The poles were made by cutting two cylinders off a broom stick to a length of four inches. A brass screw eye was fastened in one end of each cylinder to which the wires were attached. The cylinders were covered with tinfoil which was also wrapped around the brass screw. A lathe was used in the winding of the coils.

The batteries were unique affairs. Two fruit jars with the tops taken off by means of a hot wire, answered for the jars. The carbons were picked up under the street electric lights where they had been cast by the lamp trimmers. Two pieces of zinc were cast in a mould, a nearby foundry furnishing the sand. Four carbons properly insulated from the zinc but connected by a strip of copper were clamped on each side of a zinc, two bolts passing through wooden side pieces, binding the parts together. The solution used was bichromate of potash and sulphuric acid, diluted with water: 12 parts (by weight) bichromate of potash, 25 parts sulphuric acid, 100 parts water. After the bichromate has dissolved in the water, mix in the acid slowly. The batteries should be removed from the solution when not in use.

CAST WASHER.

One of the simplest patterns that can be made on the lathe is that of the cast washer shown. While the one given is intended for a bolt 1⅛-in. in diameter any other size can be made. The bridge builders have determined on certain sizes which can be called standard and the main dimensions can be figured from the following formulae:

D=diameter of bolt.
W=diameter of washer at bottom=4 D+¼″
H=diameter of washer at top=2 D+⅛″
T=thickness of washer=D—⅛″
Weight=$1.8D^3 + .25D^3$
Radius of curvature of upper surface as seen in section=D

BIRD HOUSE.

The bird house shown is one which received honorable mention in the Manual Training Magazine Competition No. 3. Harris W. Moore, whose design it is, writes as follows concerning it: "In teaching this model the principles of box construction may be emphasized, *i. e.*, that the grain runs horizontally in the sides and ends and that the sides are nailed onto the ends. After the roof boards have been planed to size with square edges, the narrow one is nailed in place and the bevel planed to the proper angle by letting the back part of the plane rest on the side of the house. In a somewhat similar way the bevel of

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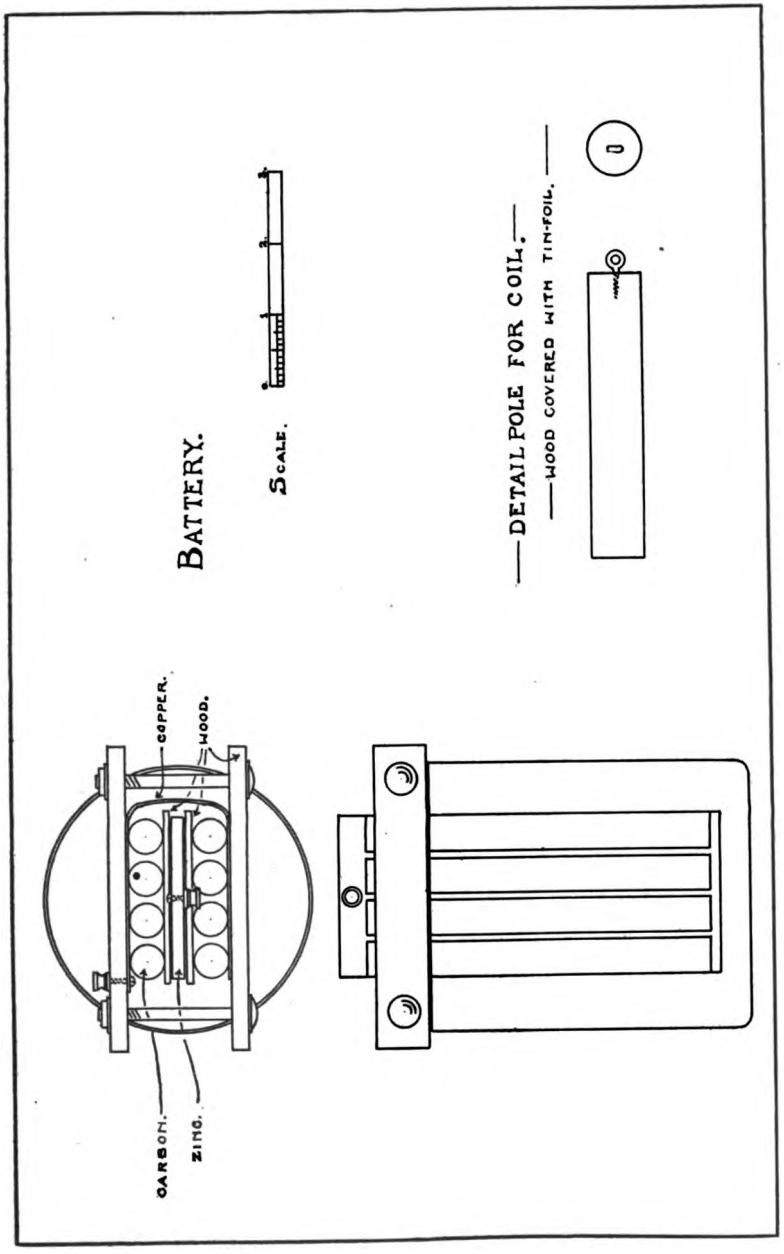

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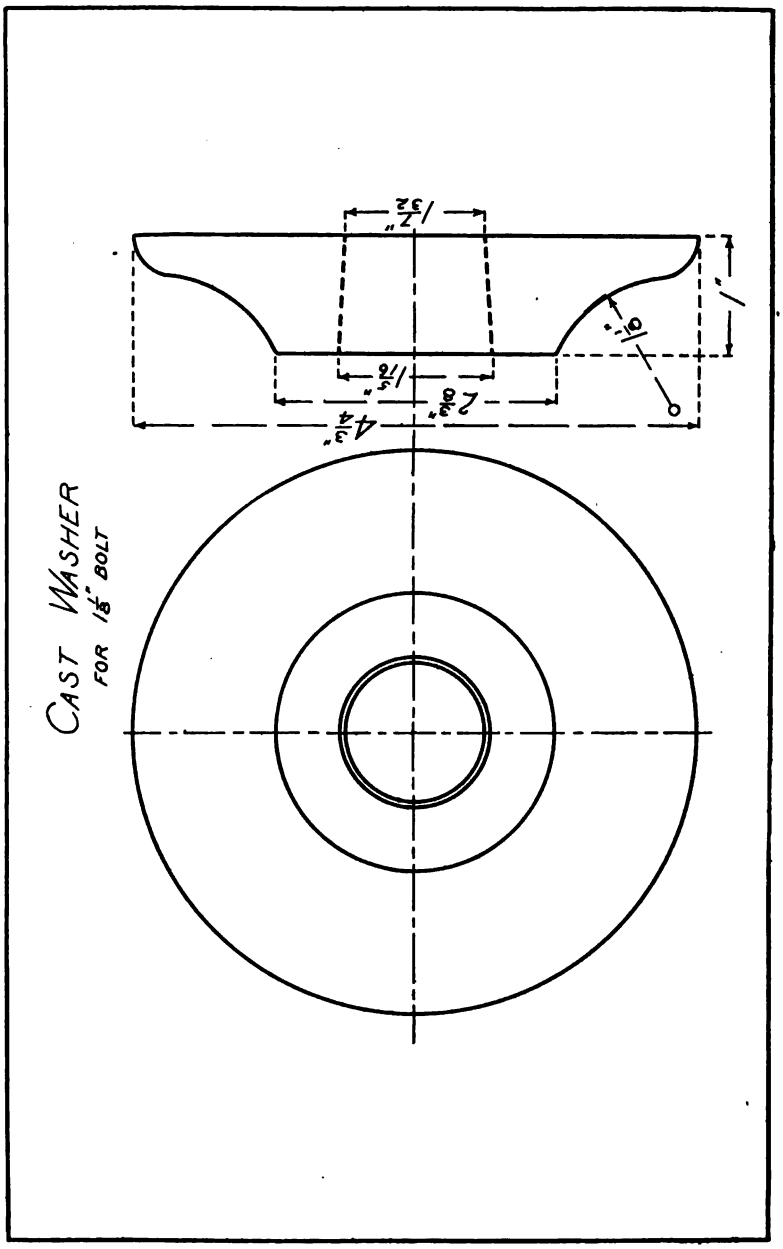

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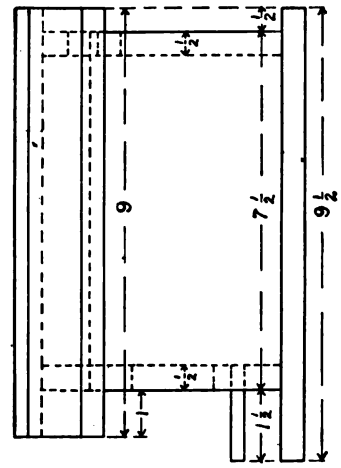
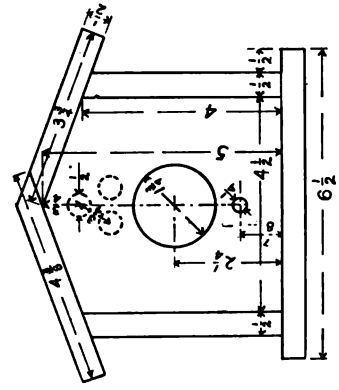
BIRD HOUSE





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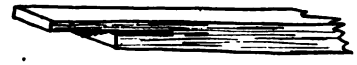
the wider roof board is planed after it has been nailed in place by allowing the plane to rest on the narrower board. Care must be taken to set all the nails before planing over them. The large hole may be bored with a center bit which is an inexpensive boring tool. If the house is fastened to a branch which sways with the wind, the English sparrows will not build in it, though the native song birds will."

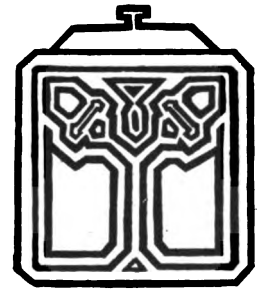
NOTES.

In sharpening plane bits it is often convenient to have some sort of clamp which will hold the blade at a constant angle. One that can be easily constructed is shown in the sketch. It is made by simply cutting a saw kerf lengthwise of a heavy board the width of a plane bit and then sawing off a portion



of the under half of the piece. The plane bit will readily fit into the saw kerf and be stiffened by the part of the wood that comes above the blade. The other end of the clamp may be supported by a cleat properly placed on the wall close to the grindstone or if the wall is too far distant a lathe floor stand can be utilized. Lacking either of these, another piece of wood can be attached to the frame of the grindstone and the clamp rested upon it.

If a sort block of wood is fastened at either end of an oilstone and made flush with the top of the stone, the end of the stone will be used more frequently and it will not become so worn at the center.



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CURRENT ITEMS[1]

CLINTON S. VANDEUSEN, Editor.

Luis Florez of Santiago, Chili, who was sent to this country to study the manual training work for the benefit of the schools of Chili, spent his time in Columbia, Cornell, and the Oswego Normal School, studying the work of these institutions. Mr. Florez recently sailed from New York for South America by way of London, where he will visit schools and study the manual training problem as treated in England.

When Benjamin Franklin died he left one thousand pounds to Boston. The money that has accumulated from that sum, together with an equal amount contributed by Andrew Carnegie now amounts to nearly one million dollars. This fund will be used in founding Franklin Union, a trade school that will afford an opportunity for the practical training of mechanics, draughtsmen, engineers and other skilled workmen. The building is to be of brick and stone, four stories high, and will be thoroughly equipped for this line of work. Evening classes will form an important part of the school work.

The Department of Forestry in circular 116 entitled "The Waning Hardwood Supply" states that the annual cut of hardwood is a billion feet less than it was seven years ago, and that during that time the prices have advanced from 25% to 65%. Where is the future supply of hardwood to be found? This question is also discussed in the circular.

Ernest Nelson, special commissioner of education for the Argentine Republic, was present at a recent exhibition of manual-training work in Springfield, Mass. He was so much pleased with it that he wanted to buy the whole affair, but in this he was sadly disappointed for the children would not sell. For one piece he offered $50, but without the desired result. Evidently manual training in Springfield, at least, has not yet been inoculated with the germs of commercialism.

Dr. Frank Rollins, principal of the Stuyvesant High School, New York City, in his inaugural address as president of the Schoolmaster's Association, declared that, with the progress of civilization, the definition of culture had changed materially. Formerly it meant the ability to think, and now it has been extended to include the ability to do. It being the function of the industrial schools to teach pupils how to do things as well as to think, he claimed that these schools are fulfilling the requirements of culture.

The course given by Dr. Haney last year at the School of Pedagogy of New York University, on the teaching and supervision of the manual arts was so well received that three courses are being conducted by him this year. One course is on "Methods of Teaching Manual Arts," one on "Color and Applied

[1]The success of this department depends largely upon the number of teachers throughout the country who have enough professional spirit to send us items. We invite every reader to send whatever he considers of sufficient general interest to be worthy of publication. Items should reach us on or before the 25th day of December, February, April and August. We are grateful for all contributions, but of course we must be allowed to decide which shall appear in the Magazine.—Ed.

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Design," and one on "Principles and Practice of Supervision." Dr. Haney is also giving a college extension course at Newark, N. J., on "Practical Lessons in Applied Design."

Secretary Charles H. Morse of the Massachusetts Commission on Industrial Education has recently announced that it is within the power of the commission to co-operate with school boards of cities and towns in the state in the maintainance of evening schools for industrial education. The basis of the co-operation is the payment by the state of half the expense of carrying on such schools, the commission having a general oversight of the school but acting through the local authorities.

The addition to the Providence Technical High School is completed, but much of the equipment is yet to be installed and it will be sometime before all departments are again in operation. The building will now accommodate nearly a thousand pupils and at the present rate of increase will soon be filled.

W. C. Hamblin head of the drawing department, Providence Technical High School, has accepted a similar position in Jersey City, N. J. A. F. Rose also of the drawing department now has charge of manual training in East Boston High School. Their places have been filled by Arthur Ray and Chas. Martin.

The New York Orphanage at Yonkers, N. Y., has elected David S. McFarland to a manual training position.

Frances E. Mack is now a manual training teacher under Supervisor Dodd, at Trenton N. J.

Donald S. McGuire is assisting Bradley S. Joice in the manual training department of the Maryland School for the Blind at Baltimore, Md.

Herbert F. Rodgers, a graduate of McGill University, was recently elected to a position in applied electricity at Mechanics Institute, Rochester, N. Y.

Anna L. Hamm has been appointed to a manual arts position in the public schools at Batavia, N. Y.

F. H. Wing, formerly vice-principal of the high school at Gowanda, N. Y., and James E. Seaborn, from the Rochester Schools, are two recent additions to the force of manual training teachers in the Buffalo schools.

Carl F. Cotter has been selected to succeed James F. Barker as director of the Hackley Manual Training School. He was formerly instructor in mechanical drawing in the same school.

A new manual training and domestic science building was formerly opened Oct. 24, at Onawa, Iowa. President Storm, of Ames College gave an interesting address as part of the program. This building is one of the best in the state for this line of work and was the gift of one of Onawa's public spirited citizens.

Mrs. Alice D. Feuling, formerly of Bradley Institute, Peoria, Ill. has accepted a position as head of the domestic science department at the Iowa State Agricultural School at Ames.

The St. Louis Manual Training School has introduced the study of the automobile. The new course is open to boys who have completed the work of the first three years. A first-class machine is mounted for testing and students make an intensive study of its mechanism.

Anna Cron, formerly in charge of manual training at Emporia, Kan., spent

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the past summer at the Columbia University and is now in charge of manual training in the ladies seminary at Denton, Tex.

F. R. Abbott has a leave of absence from his work at the Kansas State Normal school to attend Columbia University.

Manual training in the Province of Manitoba, is making steady advances. Two teachers were added to the staff in Winnipeg in September and one new centre opened. Provision is now made for bench-work in grades five to eight, sewing in five to seven, and cooking in grade eight. Training classes have been established in clay modeling, basketry and wood carving and it is hoped to give the pupils in the lower grades more hand work at a very early date. An enthusiastic staff of teachers in the model school have given considerable attention to basketry, clay modeling and weaving, with very gratifying results. Brandon school board has the subject of manual training under discussion and will establish a school there in the immediate future.

Wm. B. Hamilton, a graduate of Alabama Polytechnic Institute has charge of the mechanics arts department of the Louisiana Industrial Institute at Ruston, La. He has as assistants R. J. Smith and E. L. Shattuck. Mr. Smith has been in the school a number of years but Mr. Shattuck is a new man, a graduate of Kansas Agricultural College. Prof. R. W. Selvidge, who has had charge of this department for four years is now taking special work in Columbia University.

OHIO.

Three new teachers were called to the manual-training department of Cleveland just after the opening of school in September: James D. Littlefield, Lyman School for Boys, Westborough, Mass., was assigned to the forging department of Central High School; John W. Vickerman, from the Manual Training High School, Saginaw, Mich., takes charge of the machine work in the same school, and Joseph Bayley of Chicago fills a position as instructor of woodwork in the grammar grades.

The foundations of the new Technical High School at Cleveland have been laid and the walls are being erected. The main building, occupying a full block on E. 55th street, is to be three stories high with wings in two side avenues. One of these wings, two stories high, is devoted entirely to shops. The other wing, three stories high, and the main building are devoted to class rooms, laboratories, art and domestic science. A large auditorium occupies the center square with a gymnasium below. The building is to be of chocolate-colored shale brick with terra cotta trimmings and dark red Spanish tile roof. The architecture is the English Gothic style. The property occupied by the building was secured at a cost of $55,000. The contracts for the building, exclusive of equipments, amount in round numbers to $300,000. The building will accommodate 1000 pupils.

The Board of Education at Dayton has set aside $168,000 with which to build and equip the west wing of a Manual Training High School. This building will eventually cover a lot whose dimensions are approximately 167 x 216 feet. The building will soon be under way. If present plans do not miscarry the completed building will cost about $350,000, including equipment. George Buck, principal of the East High School, will be the principal of the new Manual Training High School.

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Denison University is making a beginning in manual arts this year. Miss Laura Parsons, the instructor in art has organized classes in art metal work. Next year it is the intention to introduce benchwork in wood. Considerable attention has been given to the fine arts for a number of years and the authorities are finding a large demand for manual training.

W. S. Carter, who has had charge of the manual training work at Greenville for several years, is supervisor of manual training at Hamilton this year. Charles J. Gould comes to Greenville and the work will be enlarged. Sheet-metal work, applied dsign and mechanical drawing will receive considerable attention. Heretofore benchwork and wood-turning have constituted the manual training work given the boys. Greenville is distinctively an agricultural center and, through the efforts of Supt. W. S. Rowe, considerable attention has been given in the schools to school gardening. The pupils are much interested in their work and many of them continue the garden work during the summer vacation.

"School Life," a new educational monthly published at Dayton, is devoting several pages each month to a discussion of manual training problems. Elementary agriculture is also receiving attention.

Under the leadership of A. B. Graham, of the Ohio State University, and Dr. B. M. Davis, of the Ohio State Normal College of Miami University, the State is coming to the front in school gardening and elementary agriculture, especially in the rural schools.

Among the beginnings of rural manual training in the State, a little one-room school house near Thackery, in Champaign County, has had an important place. Here in 1896 the teacher placed a work-bench on one side of the room, together with a foot-power scroll saw to which was attached a small turning lathe. At odd times the larger boys made brackets, match safes, mallets, etc. and the girls made a number of articles out of cardboard. During the summer of 1903, a two-roomed school building was erected at Thackery. Later a Township High School was established in the building. Harry E. Roberts was elected principal of this school. He wished to keep up the "spirit of '96"; so last fall a manual training club was organized, a work-bench was made in the basement by teacher and pupils from lumber furnished by a local grain dealer. The old scroll saw, used ten years before, with three others, were installed. Tools and lumber were secured by private donation—the board of education was at no expense except for drawing paper. The club was composed of three divisions each having a special time to work. The only time the teacher had for instruction was at recesses, noon hours and after school. The enthusiasm became so great that some worked at night. The manual training work did not detract from the other school work. Not one tardy mark was made during the year and the average attendance was more than 95 per cent. Parents manifested more than ordinary interest in the work of the school. In the final examinations only one pupil failed to pass. At the close of the year the best of the work was collected, with a few of the pieces made in '96, and sent as an exhibit to the Jamestown Exposition. This is an illustration of what may be done in rural and other small schools with little or no expense to school authorities and without in any way lessening the effectiveness of the other school work, but rather increasing it.

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All over the state there is a remarkable awakening to the value of the manual arts in the school curriculum. Dozens of schools are introducing the work this year. The usual method of making a start in the smaller school systems where a special supervisor is not possible, is for the drawing teacher to take charge of the handwork in the lower grades and a principal of a building or an upper-grade teacher to have charge of woodwork for the boys in the seventh and eighth grades.

The Cincinnati schools have added several new teachers this year. Hartwell, St. Bernard, Lockland and other suburban towns have installed manual training.

O. P. Kimmel introduced manual training at Eaton this year; E. L. Steenrod has similar work at St. Marys. E. H. Petry is an assistant in the manual arts department of Miami University. FRED C. WHITCOMB.

MINNESOTA.

Hans W. Schmidt has been appointed supervisor of manual training at St. Paul. C. A. Medlock, Asa E. Karns and E. H. Sitzer are also new men in the department.

Red Wing introduced manual training into its public schools at the beginning of the present school year and pupils from the seventh and eighth grades and high school are taking the work. A room thirty by forty feet in the high school building has been fitted up with twenty benches and the other necessary equipment. E. B. Dillingham formerly of Minneapolis has charge of the department. This city is looking forward to a manual training and gymnasium building in the near future; the high school alumni have already raised a substantial sum as a starter.

Winona put in manual training this fall with a work room in the high school also one in the Madison and Washington grade buildings. V. I. Sandt has charge of the work.

Woodwork and machine design are given to the boys in the high school and sewing to the girls in the seventh and eighth grades at Anoka. Max F. Pitman is in charge of the work for the boys.

Montevidio started manual training this fall in the high school and the grades. Equipment is provided for sixteen pupils and the work is in charge of Earl Udell.

Kenyon and Fergus Falls are two other places in which manual training has been started this year.

Sewing has recently been started in the seventh and eighth grades of the Faribault schools and a course of forge work has been added to the manual training work. A. K. Grube recently resigned from the department to take up farming and his place is now filled by Merton I. Lyon of Menosha, Wis.

George G. Green has left the Moorhead State Normal School and is now manager of "The Craftsman's Guild, a company of workers who try to do little things well." at Highland Park, Illinois. His place in the Normal School has been taken by A. P. Laughlin, formerly supervisor of manual training at La Grange, Illinois.

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ILLINOIS.

Manual training high school facilities are being extended in Chicago. In addition to the Lyman Trumbull Manual Training High School, which has already been provided for, plans for two other manual training high schools—one at South Chicago and the other at Irving Park—have been prepared by the architect and are now in the hands of manual training supervisor, Robert L. Smith, who is working on the equipment. These two schools, however, will not be provided for until next year's appropriations are available.

Ten more manual-training centers have been added in the Chicago elementary schools. Sixteen years ago there was not a single manual training or household arts center in the city. Today there are in active operation 172 elementary schools which have a manual training equipment, 38 elementary schools which have a cooking department, and three manual training high schools, while several other equipments are under way. When it is recalled that the total number of elementary schools in the city is only 253, this proportion is significant.

Supervisor Smith says that the difficulties in the way of extension of these departments do not usually arise from any disinclination of the people to approve of them; on the contrary, there exists an earnest desire in many quarters that these branches be included in the curriculum. The main obstacles seem to be (1) necessary expense of equipment, (2) difficulty in providing suitable accommodations, and (3) the scarcity of qualified teachers. Regarding equipment he says: "It should be remembered that efficiency, stability and permanence are the only tests of cheapness. The best would always be found the cheapest, and in many cases the saving of a few dollars in the initial cost of equipment has been found to entail a much greater cost later on in the way of repairs, adjustment and alterations."

The University of Illinois was opened in 1867 with an enrollment of seventy-seven pupils and four instructors. In 1906 at the close of its 40th year it had four thousand and seventy-four students and four hundred and eight instructors. One of the newer departments of the university is the school of education. Its function is to co-ordinate all the forces of the university that can be utilized to prepare teachers for work in high schools and for positions as superintendents.

The annual exhibition of Art Crafts at the Chicago Art Institute is announced from Dec. 10 to Dec. 22, and the annual exhibition of the Society of Western Artists from Dec. 10 to Dec. 29.

Lawrence A. Flagler formerly in charge of manual training at Marquette, Mich., is now supervisor of manual training at Peoria, P. W. Thompson having resigned from the position to take up the study of law.

Miss Helen Day formerly instructor of domestic economy at Teachers College, New York, is now assistant professor of domestic science at Bradley Polytechnic Institute.

CALIFORNIA.

Two well equipped manual training shops have been opened this year at the State Normal School, Chico. Maude Crouch has been elected shop teacher, and a special course in mechanical drawing and manual training has been added to the curriculum.

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Natie P. Clark has been elected director of domestic science at Oakland and Ada M. Bailey takes Miss Clark's place at Santa Anna.

The following appointments are announced at Throop Polytechnic Institute. Hettie Anthony from Illinois Wesleyan University, head of the domestic science department; Frank C. Bodine, assistant professor of architecture and machine design; Margaret Donaldson from the McKinley High School, St. Louis, instructor in art; Alfred Guillou, education and normal manual training; Howard Foster, instructor in machine shop practice and pattern making; Louise K. Willits, instructor in domestic art.

KITE FIELD DAY.

The making and flying of kites has long been an important feature of Japanese sports and "Kite Fetes" are often held in which kite makers contest for supremacy in the art of kite flying. Naturally enough it was on the Pacific coast that the idea was first made use of in this country, and as this was in connection with the public school work, manual training teachers will be especially interested in a report of the experiment. The idea was worked up last year by Chas. M. Miller, assistant supervisor of manual training at Los Angeles, Cal., and in carrying out the idea he had the enthusiastic co-operation of Dr. E. C. Moore, the superintendent of schools.

The plan involved the scientific construction of kites by the children and the holding of a kite field-day on which kite flying contests were held. Definite instructions on kite making were given as part of the manual training work, and an early announcement of the details of the contest were made. The contest was sucessfully carried out on Field Day and was witnessed by about fifteen hundred children. The following instructions as sent out to the various schools will make clear the methods of carrying out the plan.

To the Principals:—Please read the following announcements to your classes.

The weather permitting, there will be a general contest and exhibition of kite flying, on Saturday, May 4, 1907, beginning at 2 o'clock. The exhibition will take place on a tract at Stevenson Ave. and Lorena street, Boyle Heights. The place is accessible to both the Los Angeles Railway and Interurban lines.

A number of feats will be carried in contest, but a general exhibition will follow in which anyone may take part, so all bring a kite.

Each school must decide who the contesting party shall be for each of the contested feats, and should send in the names of such contestants to Chas. M. Miller. 512 S. Boyle Ave., not later than Monday, April 29th. Please write names on postal cards or cards that size so as to keep a uniform size for easy filing.

Each school may appoint a substitute in case of failure of the first person named. Each contestant is entitled to a helper.

It is suggested that a captain be appointed by each school to be recognized as general manager for that school.

The ground will be plotted out in squares 100 ft. x 100 ft. and these running spaces numbered. The captains may select their plot any time after 1 o'clock. A banner, pennant or other means of designating ownership of that plot should immediately be placed in the center to avoid further misunderstanding, but the

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This diploma is awarded to
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at the First Los Angeles Public School Field
Contest held May 4th 1907.
Supt. City Schools
Director of Art Construction

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number and name of the school, with the captain's name, should also be brought to the judges' stand at once.

Each school must appoint a judge for its own feats, such as timing flights, and recording pulling power. A teacher is desired for this, but in case a teacher cannot be present, the captain may act, or some other appointee.

A swift messenger should carry the record to the judges' stand as soon as the result is known.

To add color to the occasion, it is recommended that scarfs of colored cloth, etc., be flung across the shoulders of participant.

Each school will need a correctly set time-piece, and some spring scales, showing pounds and quarter pound. The latter can surely be borrowed for the occasion.

The name of the school should appear in conspicuous letters on the kite. Some of the strips of gummed paper may prove useful for this purpose.

Make your space as gay as feasible. Streamers on the kite-strings, banners floating, and all such will add much to the occasion.

FEATS OF KITE-FLYING CONTEST.

1.—Quarter mile dash, being the quickest playing out and winding in of ¼ mile string. The string must be accurately measured and a report card 3¼″ x 6¼″, with the principal's signature on the back wound at the inner end. The first two rounds over the card should be, one length wise, the other across. This compels each contestant to unwind the entire length of string to obtain the card, which must not be torn, and which must be sent with record to judges' stand.

2.—The same as number one, for girls only.

3.—Best decorated kite (to be exhibited on 600 ft. string.) Any shape or kind may be used.

4.—Most artistic kite (on 600 ft. of string). Any kind of combination, or color or outline. Set pieces or single construction.

5.—Strongest single kite puller. Record to be taken within one minute from a given signal. It is suggested that the heavier kites be avoided, for we have had very few days that the breeze has been sufficiently strong to carry up the heavy frames.

6.—Best tetrahedral kite. If there is insufficient breeze to carry kites, they will be judged by the appearance and construction on the ground.

7.—Yacht race, ¼ mile and return. (To be timed). The size should be as shown in the diagram.

8.—Highest flyer, in which the decision must rest on the judgment of the judges. Thirty minutes time will be given for this feat. Tandem and other combinations may be used.

9.—Curious messenger. Everybody.

10.—Display of parachutes. Everybody.

11.—Display of flags. Everybody.

It will not be necessary to pull down the high flyers for the last three, as no decision will be necessary for these, but any specially brilliant accomplishment will be given recognition.

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REVIEWS

Handbook of The Trees of the Northern States and Canada, East of the Rocky Mountains. By Romeyn Beck Hough. Published by the Author at Lowville, N. Y., 1907. 7½ x 9½ in.; pp. 470+X; price in cloth, $8.00, in half leather, $10.00.

This is the first really satisfactory handbook of trees that we have seen. Indeed one feels like congratulating the author on having produced the perfect book on trees for the great majority of readers. It is not, however, what is often known as a "popular" book, for it is equally valuable to the professional botanist, the nature lover, the forester and the lumberman. Coming from one of the leading American authorities, the author of "American Woods", it should be scientifically correct, and being so well arranged and so fully illustrated with the best of photographic reproductions, it is both convenient and attractive.

Each species is given two opposite pages. On the left is a full-page illustration of its leaves, winter twigs and fruit placed on a background laid out in one-inch squares. Thus one immediately forms a correct idea of sizes. Not only this, but instead of showing one leaf and one specimen of fruit, several are shown—large and small. This is not only interesting, but exceedingly important when one is trying to identify such trees as the sassafras, tulip or mulberry. On the right-hand page is a photograph of the trunk of the tree upon which is fastened in a horizontal position a two-foot folding rule. These illustrations are admirably clear and show the character of the bark and often peculiarities of growth, as in the case of the dotted thorn, for example. On this page also there is a map shaded to show at a glance in which states and provinces the tree may be found, a condensed description of the tree, and in many cases a magnified transverse section of its wood.

At the end of the book about forty pages are devoted to a synopsis of the families and genera represented in the book with analytical keys leading to the species. To this is added a glossary and an index.

One use of the book is well illustrated in the following experience: A few days before receiving a copy of Mr. Hough's book a nature-loving friend of mine was conducting me on a long walk through the woods, when we came across a kind of tree that I had seen several times before but did not know its name. So I said to my friend, "What do you call that tree? It's trunk looks like an oak but the leaves do not." Now my friend has a rare appreciation of beauty of form and color, moods and music in nature, but he is not an expert botanist. However, he said, "I think it may be a laurel oak." As the leaves were long and somewhat glossy I accepted his suggestion as fact until I received a copy of "Handbook of Trees." The moment I turned to the pages of laurel oak I saw by a glance at the map that the laurel oak is found only along the Gulf and the South Atlantic coast. On turning the page over, however, I found that the shingle oak grows in Illinois and, upon looking at the shape of the leaves again,

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I was convinced that my friend and I had been enjoying the company of shingle oaks instead of laurel oaks.

This incident illustrates only one of many ways in which this admirable book will prove useful to anyone who wishes to know the trees.

A Course in Structural Drafting. By W. D. Browning. The Industrial Magazine, Collinswood, Ohio, 1907. 6 x 9-in., pp. 64 + 15 double-page plates; price $1.00.

This contais a description of material used in structural design, tables compiled from handbooks used in standard drafting-room practice, definitions of terms used in strength of materials, simple rules and illustrations on beams and girders, columns and lacing, and diagrams with explanations of modern trusses. There are fifteen plates of drawings, such as are made in structural design work, to be done by the student. The book is simple, clear, practical, and well adapted to beginners in structural drafting. FREDERICK H. EVANS.

The Making of a Teacher. A contribution to some phases of the problem of religious education. By Martin G. Brumbaugh. The Sunday School Times Company, Philadelphia, 1905. 5½ x 8-in.; pp. 351; price $1 net.

This book discusses religious education in the light of the principles and methods of modern pedagogy. Every Sunday-school teacher should find it not only stimulating and instructive, but very readable. But few of the technical terms of the psychologist are used and the author's points are made clear by illustrations.

The following have been received:

Bulletin of the Art Institute of Chicago. This is the first number of a quarterly publication which will give announcements of exhibitions and lectures, and information of general interest to the thousands of people who habitually visit this great democratic art center. Last year the attendance of visitors to the galleries (exclusive of students) was 522,095. The price of the Bulletin is 10 cents.

Report of the Massachusetts Commission on Industrial Education, 1907.

All who were interested in the report of the preliminary commission which was published little more than a year ago and made such a "profound impression upon educators and public-spirited citizens generally" will welcome the first annual report of the permanent commission of which Professor Paul H. Hanus is chairman and Charles H. Morse is secretary. In this report the Commission defines its position, outlines future work and gives the present situation with reference to industrial education in the different cities of the state. Appended to the report are statistics, courses of study and several interesting papers bearing on the general subjects of industrial education.

Exercises in Elementary Agriculture—Plant Production. By Dick J. Crosby. Bulletin 186, U. S. Department of Agriculture, Washington 1907. pp. 64, illustrated. Every teacher of school gardening or elementary agriculture should send for a copy of this bulletin. It contains fifty-four graded exercises or experiments in plant production with introductory notes and an appended list of textbooks and works of reference. The illustrations add much to the value of the bulletin.

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Course of Study in Manual Training for Boys of the District Schools, St. Louis, Mo. Revised June, 1907. Contains drawings for seventh and eighth grade models.

The Man Who Works with his Hands. By Theodore Roosevelt. An address delivered at the semi-centennial celebration of the founding of agricultural colleges in the United States, at Lansing, Mich., May 31, 1907. Circular No. 24, U. S. Department of Agriculture, Washington, D. C.

Production of Red Cedar for Pencil Wood. By L. I. White. Circular No. 102, Forest Service, U. S. Department of Agriculture.

Catalogue of Manual Training High School, Indianapolis, Ind. Contains outline of course of study and half-tone illustrations of equipment and students' work.

Domestic Science Course. The course used in the grammar school department of the Toledo, Ohio, public schools. Published by the Board of Education; price 25 cents postpaid.

Annual Report of the Inspector of Technical Education, Canada, 1906. By Albert H. Leake, Toronto, Canada. Contains many half-tone illustrations of work done in the Canadian schools.

Teachers College Record, September, 1907. This number deals with the curriculum for the seventh year of the elementary school, and contains an article by Egbert E. McNary on manual training for boys. It deals especially with the study of modern transportation as taken up by a seventh-grade class in the Horace Mann School. This number also contains an article on manual training for girls by Laura B. Whittimore.

National Society for the Promotion of Industrial Education. Bulletin No. 3. —A Symposium on Industrial Education. Bulletin No. 4.—Industrial Training for Women. Edited by James P. Haney. Copies can be obtained by addressing the secretary of the society, Charles R. Richards, Teachers College, New York City. Both of these are valuable contributions to the present discussion of industrial education. The former is made up of opinions from many of the representatives of both labor and capital; the latter is the work of a sub-committee on industrial education for women, headed by Mrs. Mary Morton Kehew of Boston.

The Interlaken School. Announcement of a boarding school for boys at Laporte, Indiana, patterned after Dr. Cecil Reddie's famous school at Abbotsholme in England.

Elementary Turning.—For use in manual training classes. By Frank H. Selden. Rand, McNally & Co., Chicago, 1907. 4¾ x 7 in.; pp. 197 with many illustrations of tools, processes and models; price $1.00. Reserved for later notice.

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MANUAL TRAINING MAGAZINE

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Future Articles

Among the good things promised for the near future are the following:—

"The Wash Method of Handling Water-Color," by *Frank Forrest Frederick,* director of School of Industrial Art, Trenton, N. J. This is a technical article describing the method in detail, and illustrating it by means of a series of wash drawings by the author. The illustrations will also include a three-color reproduction of one of Mr. Frederick's water-color paintings.

"Some Experiments in Eelementary Manual Training," by *Harris W. Moore,* instructor in manual training, public schools, Watertown, Mass. This article will discuss boys' interests with reference to the benchwork of the upper grammar grades, and show what is being done in Watertown.

"The Decorative Aspects of Plant Forms", by *Dr. James P. Haney,* director of manual arts, public schools, New York City. We are sure that every teacher who has read Dr. Haney's two series of articles already published in this magazine, and his contributions to the year-book of the Council of Supervisors will welcome this announcement. The article will be illustrated with a half-dozen or more plates of selected floral forms.

"Manual Training in New Zealand", by *G. George,* director of technical education in New Zealand and vice-president of the National Association of Manual Training Teachers of England.

"Drawing Room Equipment for Technical High Schools", an illustrated article by *Frank E. Mathewson,* head instructor in drawing, Technical High School, Springfield, Mass., and president of the Council of Supervisors of the Manual Arts.

"Planning a Manual Training High School", by *Fred D. Crawshaw,* principal of Franklin School, Peoria, Ill. A helpful discussion illustrated with floor plans of three typical American manual training high school buildings.

"Interest Aids in the Grade Shop", by *Louis C. Butler,* Eads Avenue Training School, St. Louis, Mo.

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CONTRIBUTORS TO THIS NUMBER

HENRY TURNER BAILEY—Born in Scituate, Mass. Graduated at the Scituate High School in 1882 and the Massachusetts Normal Art School in 1887. Taught drawing in the night schools of Boston, 1884-5 and was supervisor of drawing in public school of Lowell, Mass., 1886-7. He then accepted the position of State Agent for the Promotion of Industrial Drawing which he held until 1903 when he became editor of the *School Arts Book*. Under his supervision the public schools of Massachusetts came to lead all the other states in their work in drawing. In this work he also won a national reputation as a lecturer. Mr. Bailey has written books, reports, monographs and magazine articles on art, drawing, design, teaching and Bible study. Indeed, his writings are so numerous and so well known that it is superfluous even to mention them here. He is a member of the Council of Supervisors of the Manual Arts and of the Society of American Authors. Another side of Mr. Bailey's work is not so well known. His study of art has led him to architecture and the crafts. He has been the architect of several buildings, both public and private, has done practical work in designing for several printers, publishers and manufacturers in Massachusetts and, through his interest in civic improvement is doing a unique work at his "Bayfield Shop" in North Scituate in designing and manufacturing artistic guide boards, street signs, signals, etc., and in reproducing colonial furniture. Those who know Mr. Bailey in his own home are aware of the fact that not one of the things above mentioned is his particular private hobby. That is reserved for the painting of North Scituate sunrises. Thus he keeps himself sensitive to the beauty of the world.

EDWIN L. TAYLOR—Born in Leon, N. Y. Attended the village school and then Chamberlain Academy at Randolph, N. Y. After leaving the Academy he spent about a year in the study of agriculture at Cornell University and four years at farming. He then entered the Mechanics' Institute at Rochester, where he completed the manual training course for teachers. During the second year of his course he became an assistant teacher of drawing at the Institute and taught an evening class in woodworking in the public schools. Upon graduation he was placed in charge of the woodworking at the Institute and remained there one year. He left there to take his present position as director of manual training in the State Normal School at Plattsburg, N. Y.

JOHN H. JINKS—Born in Birmingham, England, the son of a builder whose workshop was his play ground. Educated in the grammar school and through private study. Served a seven year's apprenticeship in his father's carpenter shop; later carried on his father's business, retiring in 1888 and sailing for America. Worked at his trade for a while in this country and then took a course at Pratt Institute, receiving his certificate to teach manual training in 1898. He then taught for a year in Adelphi College, Brooklyn and then went to Hampton Institute to teach woodworking. Five years ago he was made supervisor of manual training in the practice school, and two years ago was given charge of all manual training work under the control of the Institute.

HENRY W. HETZEL—Born in Philadelphia, Pa. Graduated in the pioneer class from the Central Manual Training School in 1888. Learned the trade of machinist, and spent three years in making instruments of precision. Began teaching drawing in 1894 at the B'nai B'rith Manual Training School and was for ten years the superintendent of this school. In 1903 he became the secretary and treasurer of the Rose Valley Association, an organization for promoting the arts and crafts, a position which he still holds. Two years later he organized a manual training class in connection with Rose Valley shops, composed of boys and girls of the Rose Valley community (14 miles west of Philadelphia). Since 1904 he has been professor of constructive drawing in his alma mater, the Central Manual Training School of Philadelphia.

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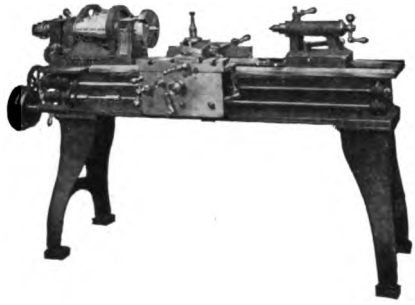

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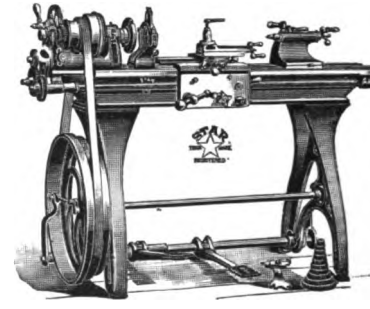

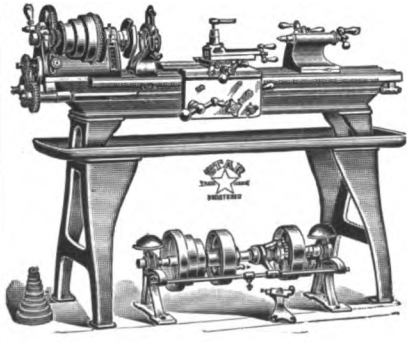

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VOLUME IX. NUMBER 3

MANUAL TRAINING MAGAZINE

JANUARY, 1908

THE INFLUENCE OF GRAPHIC ART IN THE TRAINING OF MEN AND WOMEN.[1]

HENRY TURNER BAILEY.

THE influence of public school work in the graphic arts wherever it is well done, is fourfold. *First,* it tends to develop the power to *see.* The average man sees imperfectly and images dimly. As Prof. James says: "His images have broad fringes." He cannot tell, for example, where the ordinary Roman letters are shaded, nor the shape of his own boot, nor the color of his friend's eyes. His observation with regard to all material things is loose and unreliable. As Walter Smith used to say: "His testimony in court concerning any material fact is not to be trusted because he has not a trained eye." Asa Gray used to say to his students when studying sedges: "Unless you draw, you will not see." "A pencil is one of the best of eyes," said Agassiz. Graphic representation helps to focus the eyes upon the object, as the thumb-screw focuses the camera, or as an adjusted lens corrects defective vision.

Clearer vision of natural objects enhances one's enjoyment of nature and enriches the content of life. The contours of leaves, the articulations of plant stems, the curves of unfolding petals, the outlines of insect wings, the modeling of shells (which Tennyson calls "miracles of design"), the lines of health and movement in birds, in animals, in the human figure; the subtle tints and shades, sharp glints and darks, which objects under sunlight present to the eye, the exquisite gradations of tone and hue, not only in objects everybody recognizes as colored, but in the gray and unobtrusive features of any view, become sources of keen pleasure to him who sees with trained vision.

[1]Excerpt from an address given at the University Convocation of the State of New York, Albany, Oct. 18, 1907.

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For lack of the close observation which a training in representation would supply, the average man has no clear images of his own with which to read or think. Consequently the stimuli which cause a satisfactory reaction in his brain must be intense. His music must be brass-band music, his color thrill can come only from a gorgeous sunset or the Berkshires in October. Even his news must be served up by yellow journals in flaring headlines and dramatic pictures. He can be reached only by colored posters and advertising signs ten cubits high. His recreations even must be highly artificial. At the coast the sweep of sand and sea, the dim horizon and the grace of the breaking wave mean so little to him that he must plant on the crest of the beach his merry-go-round, his roller-coaster, and all the other noisy and vulgar attractions a perverted ingenuity can invent. The majesty of Julius Cæsar and King Henry as they walk through Shakespeare's printed pages, and the calm beauty of the old king who wrote the Shepherd Psalm, are lost on the man whose power of imagination is atrophied. He must have, instead, the noise and the glitter, the reality and vulgarity of vaudeville.

The importance of clear-cut, three-dimensioned images for the imagination and the reason to use can scarcely be over-estimated. The minister who reads the matchless words of the Bible in droning fashion so reads because he *sees* nothing. Booth, Jefferson, any man with power of imagination could not read that way. The man who fails in business or in the social world fails largely for lack of "grasp," as we say, the power to image and forecast conditions, to see through to the other side of the problem, to hold the totality clearly in his mind and read it through and through. As Dean Shailer once said, "The value of drawing in all departments of science, not only as a language but as a discipline of the mind, can hardly be over-estimated. Many students entering Harvard University can think in one dimension, some few in two dimensions, but those who can think in three dimensions are exceedingly rare." Every department of human activity offers unlimited opportunity to men of vision.

But in the *second* place the study of graphic art as pursued in the schools develops the power of *expression*. It is unnecessary to review in detail the value of this power in almost every human occupation.

In a conference at Harvard University on the relation of the high school to the college in 1903, President Eliot said: "I have recently examined all the courses offered by the university, and I find but one (the course in theology) in which a knowledge of drawing would not

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be of immediate value (and even there I think it might help in some cases!). The power to draw is greatly needed in nearly all the courses and absolutely indispensable in some of them. A very large proportion of studies now train the memory, a very small proportion train the power to see straight and do straight, which is the basis of industrial skill."

Whether a carpenter remain a carpenter or become a foreman or contractor depends largely upon his power to read a working drawing. Whether a machinist remain a machinist or become a master, depends largely upon his power to put down with a pencil his ideas of mechanical construction. Whether a printer remain a printer or become a designer of fine printing depends largely upon his power to lay out a job with his pencil. The advancement of anyone in his profession,—of the designer, the illustrator, the architect, the house-furnisher, the landscape-gardener, not less than the painter and the sculptor, depends primarily on this power of graphic representation by means of line and color.

But aside from this fact, there is in the mere power to express oneself grapically a source of legitimate pleasure not to be despised. The craving for self-expression is universal and insistent. The love of self-expression graphically, lies at the basis of amateur photography. The pleasure which thousands of people derive from the camera is immense. Only one other class of people who enjoy nature, get greater pleasure from making pictures, namely, those who can make them with the pencil and brush, who can record what they wish to remember without recording the confusing details which encumber it. Representation is to the artist re-creation, and is accompanied with a passionate pleasure such as only those can appreciate who have had the experience.

In the *third* place, the practice of graphic art develops the power of *appreciation*. We are the children of the race intellectually and spiritually as well as physically. The world is full of good people who in the realm of the arts are bovine. They cannot tell one tune from another. They do not know Turner from a Teniers, or a Botticelli from a Burne-Jones. They pass and repass the far-descended venerable ornament exquisitely cut upon the porch of a colonial house, and know nothing of its presence, much less of its eventful history. They sit on Sunday in a church where the sacred symbols, first scratched with trembling hands on martyrs' graves, blaze forth their messages from glowing windows, or whisper them from font and table and altar; but having eyes they see not, and having ears they hear not. The great

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world of art is to them a nonentity. A Latin grammar, a Greek text, an algebra, a geometry, a bank book, a mill sheet, a financial report, or perchance a flock of hens, is the measure of their horizon and the arc of their sky. A man submerged in business, entombed in a shop, buried in a book is an intellectual and spiritual bankrupt.

The child never attains manhood until he secures the keys to the great treasure-house of literature, music, architecture, sculpture, painting, and the other arts, which record the experience, the aspirations and the ideals of the brightest and best of those who have gone before. The work of these men is another source of pleasure and of satisfaction which the man who would live the larger and more abundant life cannot ignore. Every attempt to represent a blade of grass, a leaf, or a flower, every attempt to catch the movement or gesture of any living thing, prepares the mind, as nothing else can, for the appreciation of the work of Dürer and Landseer, of Rosa Bonheur and William Hamilton Gibson. Every attempt to represent a tree or the sky, a body of water or the sweep of hills, will enhance one's appreciation of Claude and Turner, of Corot, Mesdag, and Fritz Taulow. Every attempt at illustration and pictorial composition will open the eyes to the almost marvelous skill of the old Italian masters, of Millet, Burne-Jones, and Whistler. Every attempt to put down the color of a flower, of a shell, of a spray of autumn fruit, of a spring landscape, of a moonlight night, will enhance one's enjoyment not only of the work of the Venetians, but of the rug-makers of the orient, of the potters of China and western Europe, of the great jewelers from the days of the Etruscans to the present moment, and of all those who have wrought in fabrics with the loom or the needle. All this appreciation of the work of men will send the happy spirit to nature again with keener eyes. The man of the anointed eye will see her as the artists and poets have always seen her, so beautiful that the shadow of a mountain daisy on a stone will inspire a poem; the glint of light on rind or fur or feather, inspire a picture; and the gloom of a calm night, inspire a symphony.

And *lastly* the influence of graphic art in public education is important because by means of it, when our pedagogical machinery is perfected, we shall be enabled to discover every particle of talent possessed by the children under our charge, and to develop it for the good of all.

The heart of man is never satisfied. We shall go on demanding illustrated books and papers, paintings to hang upon our walls, pictures

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out of doors spread before our eyes, beautiful garments and jewels, beautiful temples, civic buildings and homes; and the men and women who will produce all these in each generation are among the boys and girls in the public schools of the preceding generation. The character of the art which men and women produce depends very largely upon the amount of training they have received, and the extent to which they have been made familiar with what genius has done before them. We cannot too early discover the precious vital elements of genius in children and begin the salutary discipline which shall enable them to carry the artistic triumphs of the race to yet higher levels.

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THE PLACE OF MANUAL TRAINING IN THE ELEMENTARY SCHOOL.

EDWIN L. TAYLOR.

NO small part of the evolution of these latter days is the evolution of educational thought. As the product of this we have what we call "The New Education." Just what this "new education" is, it is difficult to define. However, in spite of absurdities and enormities that may parade beneath its banners, its manifest mission is simply the conforming of methods of education to the law of "the eternal fitness of things." The "new education" does not consist in the high handed ruling out of time-honored educational practices, or the deposing of old and essential subjects. It only seeks to recognize that a new epoch in human society demands a corresponding evolution in the school, and would modify the old, and, if need be, introduce the new that the curriculum may conform to present day conditions. Resulting from this new attitude of educational thought, we find, pervading the school of today, a subtle, potent principle that has radically changed the atmosphere of elementary education. One of the ways, in which this principle finds outward and visible expression, is a quaintly varied array of activities which, owing to the paucity of our English language have been christened manual training. This is a most unfortunate name because it is so well adapted to mislead the uninitiated "general public." What the school world knows as manual training is not manual training, the training of the hand, as the popular conception defines it, but mental training through experiences gained by manual activity.

To carefully define and defend, upon broad social and educational premises the place of this new element in the elementary school shall be the purpose of this consideration.

Obviously at the outset it will be needful to clearly state these basic premises. These are also products of the revised educational thought, the most fundamental of which is that conception that recognizes the school as an institution of society, and that primarily in educating it is not the needs of the individual but of society that must receive attention. This theory contends that the highest good of the indivual can only be served in the light of his social environment, and discovers that "the bread and butter aim," "knowledge for knowledge's sake", "general culture", "harmonious development", "moral character",—in fact, that all

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the old, formulated aims of education are included in the more comprehensive aim of "social efficiency". Social efficiency then we shall take as the real end of all education. With this premise firmly in mind let us proceed with the consideration previously stated.

In the first place the manual activities that we should select as of educational value, must embody the principle of *work* as distinguished from play. The ability to do work is a demand that society lays upon all that are able, without deference to the eminence or humbleness of their station in life. The humbler ones must not be a burden; those who have no need to take thought for themselves must labor for the race. The child then, must be trained to do work. Now work is activity, demanding sustained attention to a task that leads to an end more or less remote. Sustained attention requires will power, the lack of which denotes a low order of intelligence. Play, on the other hand, is activity leading to no ultimate aim, the activity being the end itself. Play requires no effort of the will to sustain attention. The child from its earliest infancy is active and play is nature's safety valve. The school need not concern itself about an outlet for child activity. The business of the school is to direct this innate quality of childhood toward ends acknowledged to be good, for it is by this means that will power is best developed.

We say that the child is a little savage; that his life from the cradle to manhood is an epitome of the experience of the race. This is what we mean:—the child starts with the same equipment with which the race began, namely a great abundance of practically aimless activity. From this condition, through dire necessity and bitter experience, very slowly and painfully, from very simple beginnings through stages more and more complex, the race has developed the ability of systematic and sustained effort. Likewise, through experiences selected wisely and arranged in the proper order of difficulty, the child must attain, in the span of a lifetime, this same ability that has been a race long growth.

Primarily, then, in the educative process must come the control and direction of child activity. The old education sought to obtain this end by systematic suppression. Truancy bore witness to its failure. The new education said, "Let us train the child to control and direct his activity even as he gains control of his muscles, not by idleness but by use." Then manual training found its sphere and became a necessity. If this be the function of manual training, then it defeats its own purpose when it consists of forms of busy work given the child to amuse him, to keep

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him out of mischief, to put him "hors de combat" as a source of annoyance. These things have no virtue that does not belong to play. Better far turn the child loose for a grand, healthful romp. No project, model, nor occupation may ever be made use of in the name of manual training that does not lead to some ultimate end, or serve some actual use or purpose which the child sees and acknowledges to be good, and to attain which he will give his active attention to the necessary work.

The process of development from the passive attention sufficient for play, to the active attention that labors to accomplish remote ends, must, at first, be very slow indeed. Models selected for the first grade must be simple and, at first, within the scope of a single lesson, the aim being easy of access before the untrained mind demands a change. But although our rate of progress must, at the outset, be restrained, there still must be an unwavering, unfaltering forward movement toward our aim, viz: the development of the child's power of attention,—reasonable, non-compulsory and interested attention to work. This is the same kind of attention that we, as adults, give to any labor, the result of which will satisfy some keenly appreciated need. The opposite kind of attention has but a meager place in the elementary school. We use it as a form of punishment when we detain pupils "after school" to do sums that they have slighted. However, there still exists a species of educators who propose to inflict this non-voluntary attention upon the young as the only means of developing a mental backbone. They would convince us that there is no educational virtue to be obtained otherwise than by compelling one's self to give attention to some old, dry thing that has no part nor parcel in our life that now is or is to come. Such as these have our profound sympathy. They do not believe in manual training. They have completely forgotten their childhood, and have never enjoyed that peculiar pleasure derived from giving strict attention to a dull sermon when they were very sleepy.

To recapitulate briefly. Manual training develops the power of the will, the power of attention and the power to do work. Truly it occupies a powerful place in education, but cannot other subjects do these same things with success? Yes, but manual training is better adapted to the purpose, for they must get the child still and passive before they can operate, while manual training makes capital of his very activity.

If manual training is valuable as means of developing the capacity for *work,* it logically follows that it must occupy a large place in the

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tantalizing problem of *discipline*. Outside of the personality of the teacher, the whole discipline situation is tersely stated by the old, familiar adage, "Satan finds some mischief still for idle hands to do." Evidently then, idleness and mischief are allies,—so very evident that it is axiomatic. Laziness and crime are boon companions but industry is ever a co-partner with uprightness. The application of this law to the school problem is doubly emphatic. Industry is a primary quality of social efficience, not only because it enables the individual to carry his own weight, but what is more important, it develops in him those great, noble, sterling attributes of true manhood, that render him a help and not a hindrance to the progress of the race. In other words, the industrious man is the truly disciplined man. There need be no waste of social energy to make him behave properly. Because of this demand of society the school has introduced manual training that she may develop habits of industry as an antidote for the most dangerous forms of social inefficiency. Considered in this light, industry is an end to be attained. Industry must also be emphasized as a means of no insignificance in the educative process; a means for solving the discipline problem in school as well as after.

Now industry is not to be confined to manual activity. In fact the highest forms of industry are those that are the most purely mental; those requiring the keenest perception, the greatest thought activity, the highest development of the mind. Of what value, then, is manual training in the solving of the discipline problem when the curriculum is already overcrowded by worthy subjects, demanding for their mastery an industrious application of mental power? Let us answer this question quite carefully, for it is likely to reveal several principles that deal directly with the place of manual training in the elementary school.

Discipline, like attention, is of two kinds: the one when the individual is controlled by forces acting from without, the other when the source of control is from within, or the individual is self-controlled. The one is slavery, the other is liberty. To destroy the one and attain the other is the upward struggle of the race. The discipline of the schoolroom, then, must be the discipline of self-control. Some one says, "But this cannot be so in actual practice." It is true that it is not so, but is it not our cherished ideal? What an ideal condition we would have if all the boys and girls—the ones that make our hearts ache so sometimes—were only industrious in their studies; industrious of their own volition without the pleading and driving of the patient teacher or

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the severe and oft-administered chastisement of the impatient. "But", another says, "you can't expect it. They are only boys and girls and cannot see the need of it. If they do not like study for study's sake, then what are you going to do with your beautiful theory of self-control?" Here is the secret. Simply use a method of education that brings the end, othewise too far remote, within the reach of the juvenile mind. Make those things the man must know, useful to the boy as he learns them. This is one of the functions of manual training. In this capacity it is not so much a new subject as a common-sense method of teaching the old ones. It is a form of expression that deals with actual materials instead of their soulless symbols; the hammer that clinches the nails that the "three Rs" and their associates drive in the erection of the educative structure. It is an educational transformer that changes the pupil from a state of passive, recipient lethargy to one of healthful, energetic activity; from a negative to a positive force in his own education. Manual training ought to function, not merely in the construction of articles of use, but in a lively interest on the part of the pupil in all his subjects, because it proves to him that they are all needful, not in the distant future, but now, in the accomplishment of his present plans. Given this attitude in the pupil and he has no more need of outside discipline. He is self-controlled and his teacher is no longer a police officer but an aid, an inspirer, a boon companion of experience. The discipline problem is solved, not by catering to the child's childishness, but by furnishing him with concrete and present incentives to active interest.

Our answer thus far has revealed something of how manual training functions in the solving of this problem; next, let us discover the forms that these incentives to self-control must take. It is evident, if manual training accomplish the ends above described, that it must assume some form that is attractive to the child. The results achieved by his efforts must be things that he considers "worth while." This theory is directly in opposition to that class of educators who say that they "have no patience with that tendency in education that would make it easy for the pupil." These preachers of non-voluntary attention are very logical. They claim that the rougher and less attractive we make the road for the little travelers the more rapid will be their progress in the educative journey. Pupils, to secure the proper kind of discipline, must be compelled to do unattractive things simply because the teacher says so. It is a matter of conjecture if this class of educators have ever been teachers and a positive fact that they never were boys. They have missed the

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point completely, for the pupil will do far more of that which is essentially work—drudgery, even, will not quench his ardor—if, in the end, he may accomplish some cherished aim, or express, in a form of strength and grace, some ideal of his imagination.

The foregoing conclusion forever eliminates from the elementary school all those things known as "abstract exercises," such as the planing of a board to a given size just to learn the use of the plane, or the hemming of a bit of cloth, to learn to stitch. No one cares for these things when done. In no way do they enter into the life of the maker. Their end is under the bench or in the scrap basket.

Another factor in determining the forms that manual training must assume in the elementary school is the imitative nature of childhood. This imitation is but the outward expression of an inborn tendency to grow up. This may sound a bit paradoxical, but if this tendency were lacking the mind would not keep pace with the body, and the broad shoulders of maturity would romp in childish play. The child's standard of evaluation depends, in a large measure, upon his "grown up" ideals. How soon he begins to tell us what he will do "when he gets big." He does not want to be a "baby" and do "baby things." He wants to get in beyond his depth and get out without the least possible assistance. Give the boy a paper-knife to make and his efforts will adjust themselves to the meager and limited character of the model; give him a man's chair and he measures upward to the man's stature. He is a man, "for as he thinketh in his heart so he is." Much of the reason why the pupil in the upper grades chafes at the restraint of school is, that he feels that his school achievements receive but little respect in his idealized, outside world of "real things." If the school could represent to him "real things" he would stick by it. If it does not he seeks them elsewhere, abandons study and leaves school the first day that he passes school age. Just as the race produced at first with the hands so must the youth. With the normal boy and girl the value of manual accomplishments must, at first, dominate the value of the mental. The mental must serve the manual before the developing mind can grasp the full value and true supremacy of mental ability. "Real things," measurable by manual standards, must then be selected as forms of manual training, for the presence of such in the school world acts like the discovery of a lost chord—the vital chord in the harmony of the school with what, in the pupil's immature judgment, are the truly essential things in the out-of-school world.

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Given, then, this essential chord, let us complete our harmony. Plan the construction work so that it contains a maximum of thought content; give to the pupil his constructive problems unsolved; compel him to use his knowledge of arithmetic and drawing; interest him in the geography of his materials; let the exposition of his manual processes demand a better command of his mother tongue; in short, associate what he looks upon as mere "school things" with those, that are to him the "real things," and, presently, the whole school has for him a new meaning. It has been revealed to him that the trained mind lies behind, and is the real source of all the products of the skilled hand.

Much of the effectiveness of manual training in the elementary school is lost if it be not closely associated with the other subjects of the curriculum. This conclusion obtaining, it follows that the eminently successful teacher of the immediate future is he who most thoroughly comprehends the vital association of manual activity and mental training.

It is a universally accepted fact among educators that one of the most valuable results of the introduction of manual training is its unifying effect upon the curriculum, furnishing as it does a sort of nucleus around which all the other subjects may group themselves into an effective, natural unity. The child comes to the school a living unit. It is not logical to educate him in sections.

Happiness is another factor in social efficiency which demands the investigation of its relationship to the place of manual training in the elementary school. True happiness is one of the great ends, toward the achievement of which, the race has labored. It may truthfully be said that happiness is the one great end of human society. It follows then, that the school, if true to its sacred trust, must impart that kind of training to the young that will enable them to live happy lives, or as it is oftener expressed, "to get the most out of life." To completely analyze this ideal is not intended, but there are two factors in its composition that are pertinent to our line of thought. These twain are thrift and good judgment. Their negative equivalents are want and foolishness. These great prime factors of social efficiency compel the attention of the public school. Her graduates must be equipped to earn a livelihood, and statistics tell us that for ninety per cent of them, this must be done in the elementary school.

The time was when the "three R's" were all sufficient for this end, for the educative nails they drove during the winter's school, were effectively clinched by the imperative needs of the home life. That time

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is past. Comparatively few children now have home tasks, the performance of which is essential to the common good. In the days when our grandparents were young, practically all the family needs were supplied by home production. Beneath the home roof, the children learn the rudiments of nearly every native industry. Now the product of the home is consumed outside; is exchanged so that those things consumed in the home are produced outside. The child, instead of learning something of many industries, knows scarcely anything of even one. These conditions at home produce a handicap on future happiness that the school must alleviate.

For this purpose came manual training into the curriculum, that the doors of opportunity might be opened. The old adage has it that "there are no two alike." Conditions conducive to the success of one individual cause the failure of another. If the school fits its boys and girls for happy useful lives, it must aid each to find the niche in the world of industry for which he was designed by nature. In keeping with this deduction the subject matter of manual training should be the elements of the world's industries,—and the more of them the better, for every additional industry into which we are initiated is another open door to opportunity.

"Good judgment," the second factor in human happiness to which the school must give attention, let us define as the ability to correctly evaluate the things of life. The flagrant lack of this ability is constantly in evidence in all strata of society. The little home, the haven of seclusion and rest, is mortgaged, that the possession of a gorgeous red automobile may render Smith, socially equal to his neighbor Jones. The curly headed lad in knee trousers sticks a vile roll of street pickings and paper between his teeth that he may be, forsooth, a man. The indecent and immoral theatre production packs the house with an appreciative audience while Victor Hugo's "Les Miserables," plays to empty seats and idiotic "sniggers" and "titters." The existence of these visible tokens of foolishness is nothing new under the sun. It was deplored by the prophet Isaiah who said, "Wherefore do ye spend money for that which is not bread, and your labor for which satisfieth not?" This crowning imbecility of the judgment produces a waste of time and money, and waste and want are partners in the business of unhappiness. In dealing with this hindrance to social efficiency the school should find substantial aid in the reactions arising in manual training. Obtaining, as he does by actual experience, correct concepts of the value and dignity

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of human labor, the pupil learns to know and appreciate true workmanship. He grows to love the beautiful, the artistic and genuine, to shun the vile, abhor the sham and taboo the cheap.

Our pupil in general has learned to *work,* has been properly *disciplined,* and has acquired the requisites of *happiness.* To pass through this highly educative process he has necessarily acquired a variety of *habits.* Now a habit, the student of psychology will tell us, is one of nature's tricks of economy, whereby she relegates to unconscious or subconscious reactions, any process, either mental or manual, with which the mind has become so familiar that the process no longer requires active thought. The number and quality of our habits then, materially modify our efficiency, for the relegation of fundamental processes to subconscious direction leaves the mind free to investigate and master that which is new and more complex. Because of this truth, the function of the school in the formation of correct habits, though often sadly neglected, cannot be too greatly emphasized. It therefore becomes us to note the relation of manual training to these potent factors of social efficiency. This line of thought is a natural summary of what has gone before.

It has been shown that manual training develops the habit of self-control. One phase of this habit, not commonly included in the popular concept, is important in this connection. This is self-control as functioning in dexterity of the hand, or skill. Unless there be an exception to that great law, that action and reaction are equal and opposite in direction, nimbleness of the fingers reacts as nimbleness of the mind. The truth of this is evidenced by the constant coincidence of awkwardness and clumsiness with a low degree of mentality.

It has been further shown that, through manual experiences, the habit of attention may easily be developed. No less an educator than Bishop John H. Vincent has said that "The habit of voluntary, interested attention is the great secret in education." What an educational waste would be reduced by the prevalence of this habit. If it was never necessary to recall "Thomas" from the land of dreams; if his attention to his school work was a thing of habit, a thing spontaneous, how smoothly and easily would run the educative process.

Likewise we have seen manual training functioning in habits of industry, in habits of perseverance in the face of discouragement and difficulty. An industrious perseverance that gives the human soul the glorious satisfaction, that "Something accomplished, something done, has earned a night's repose."

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The habit of activity, which in its fullest development becomes that personal initiative so essential in coping with the tremendous pressure of modern competition, is another direct reaction of the manual element in education.

The habit of honesty, of straightforward noble purpose is still another of its immediate results. Many subjects are so elusive in their nature as to enable the pupil to fool, not only his teacher but himself, as to the thoroughness with which the subjects have been mastered. Even the dread examination is no absolute criterion. Manual training is not so. If the box cover be "a fourth of an inch too small at one end" it is a frank, open failure, undeniable and chagrining. There is no question in the mind of the maker but that hard effort and through application are the price of success. This conclusion becomes his "Apperceptive mass," and as such, influences his future conduct.

The habit of personal neatness which, with one's associates and one's English, constitute a young man's passport to success, may have its beginnings in manual training. Permit me to illustrate: A mother once said to me, "It is wonderful how Richard has changed since he began this work. He used to be so careless with his things. His hat and coat were always thrown down, no matter where. Now they must be hung up just so and everything in his room he keeps in such nice order. How do you explain it?"

I replied, "Where does he hang his hat and coat?" And the secret dawned upon her as she said:

"Upon that little coat and hat cleat that he made at the beginning of the term."

Work! Discipline! Happiness! Habit! These four great factors of human character have we carefully examined as they relate to social efficiency. The study of this relationship has defined and justified the place of manual experiences in the elementary educative process. In consistent keeping with the place of the human hand in the grand achievements of human history, must be the part of that great ally of the human mind in the training of youth for efficiency in human society, which, after all, is but the prelude to that larger life, potential with the possibilities of eternity.

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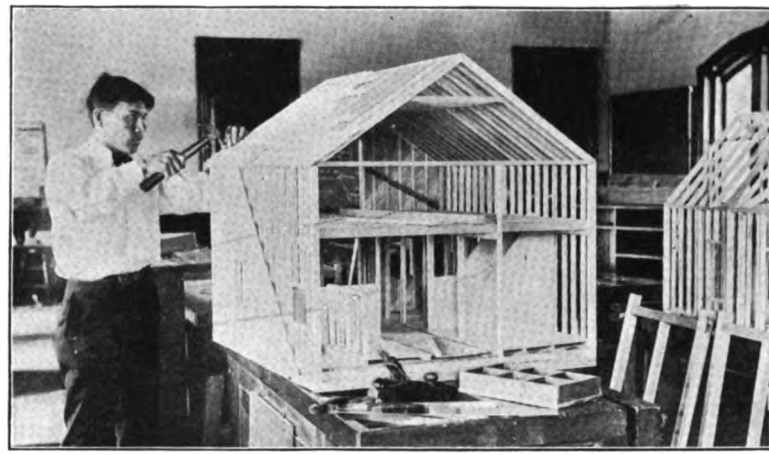

MANUAL TRAINING. AN INDIAN BUILDING A BARN. PLANS HAVE BEEN DRAWN AND ALL TIMBERS CUT TO THE SCALE OF 1½ IN. = 1 FT.

MANUAL TRAINING AT HAMPTON INSTITUTE AND ITS RELATION TO THE TRADES.

JOHN H. JINKS.

MUCH thought is being given to industrial education and there is a great deal of discussion as to what extent, if at all, the common school should contribute toward teaching industries.

Many educators contend that the common school curriculum should include some instruction along industrial lines, inasmuch as the vast majority of the boys who graduate from them will eventually follow industrial pursuits, and in most cases will finish their schooling in the grammar grades. They also maintain that the State may be expected to prepare for life's work the ninety per cent of the boys graduating from the grammar school who will engage in the trades, as well as the ten per cent for the professions by providing high school and university courses. This differentiation is made on the ground that a candidate for the high school seldom, if ever, enters it with a view to following a trade.

On the other hand there are those who believe that the common school should be employed for academic purposes only, that the manual training should simply assist in the general mental development and have no connection whatever with industrial life. Hampton Institute takes the former view and stands firmly for industrial education.

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The definite policy of the school is to give each student an education which will help him most in his life's work. In most cases this work will be of an industrial nature whether in the workshop or in the rural school. This policy was expressed thirty-seven years ago by its founder, General Armstrong, in the following words: "To train selected youth who shall go out and teach and lead their people, first by example by getting land and homes; to give them not a dollar that they can earn for themselves; to teach respect for labor; to replace stupid drudgery with skilled hands; and, to these ends, to build up an industrial system, for the sake not only of self support and intelligent labor, but also for the sake of character."

In describing the manual training and industrial work the subject will be considered under four heads.

1. What the manual training work is.
2. Its relation to the trade work and agriculture.
3. What the trade work is.
4. The effect of the manual training upon the trades and agriculture.

Before doing this, and in order that a proper understanding may be had of the general situation it will be necessary to state a few of the conditions governing the two courses of instruction, the academic course and the trade course, and also such other features of the school as necessarily influence the manual work.

The course for the day classes is arranged for four years. It includes agriculture, manual training and a course of training for teachers. The day classes are for those students who wish to take academic studies without learning a trade, and also for those who have already finished their trades and attended night school and wish to finish their academic course and obtain an academic diploma. Students in these classes attend school four or five days in the week and work for wages one or two days. Students who are not tradesmen can earn from one to six dollars a month according to their ability and the kind of work that they can do. This money is used to pay their board and other expenses and what is lacking must be paid in cash. A student's board is ten dollars a month which includes washing, heat, light, medical attendance, and a limited quantity of drugs. A new student requires from seventy-five to eighty dollars in cash during the year for school expenses. All students taking this course devote two eighty-minute periods a week to manual training. Candidates for admission must be at least

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seventeen years of age and must pass an entrance examination in academic subjects.

Students who are learning trades or who are employed in remunerative labor by day—those of the work class—attend night school. Two years in the night school are required to do the work of one year in the day school. Manual training is not included in the night school course, as the ground is more than covered by the hand work during the day.

MANUAL TRAINING. A CLASS OF FIRST-YEAR STUDENTS AT WORK.

Students who enter the work class for their first year are given an opportunity to work for wages for six days in a week for twelve months and attend night school for eight months, the length of a school term.

WHAT THE MANUAL TRAINING IS.

The following schedule is provided for regular day school students:

(a) Manual Training for Boys. (except those taking agriculture or trades.)

Time—Two eighty-minute periods a week for four years.

First year. Elementary mechanical drawing.
Benchwork.

Second year. Wood-turning.
Bricklaying and plastering.

Third year. Tin-smithing.
Advanced mechanical drawing.

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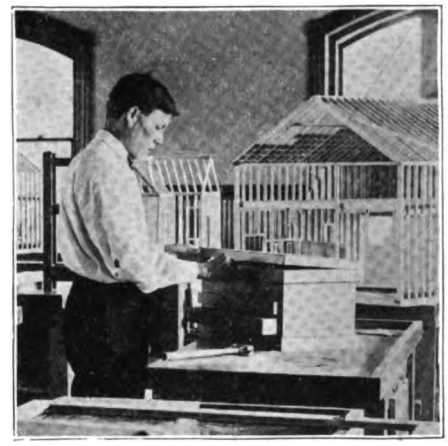
Fourth year. Elective. Methods of house construction.
Special work in teaching manual training in the Institute or neighborhood schools and special work in the Trade School.

Forging, harness repairing, house painting, printing, shoe repairing, tailoring, upholstering, and wheelwrighting, may in special cases be substituted for the regular work of the course.



MANUAL TRAINING. A TOOL CABINET MADE BY A THIRD-YEAR INDIAN MACHINIST.

Owing to the constant interchange of students from one department to the other, due to beginning or finishing a trade, this plan is changed to suit individual cases, especially when a student has finished a trade and enters the day school to complete the academic course. Furthermore, if a trade student so entering the day school is weak in any academic subject he is excused from manua training and devotes the time to strengthening the weak subject.

In the first year instruction is given in the use and care of simple woodworking tools. The articles are simple and such as are needed in a home or in the various classrooms of the school. Repairing furniture forms an important part of the work, and such repairs about the school that come within the range of the student are attended to. Problems in carpentry and house construction are taken up by those who intend to take the carpentry course the following year. If no aptitude is shown for this trade, they are otherwise advised. If another trade is selected they may then devote all the manual training time of this year to the trade chosen.

The other forms of the manual training of the second and third years are taken in the trade school under competent trade instructors. Practical business methods are employed by the manual training student who works side by side with the trade student.

The third and fourth year students include those who have finished a trade and have entered the day school to complete the academic course.

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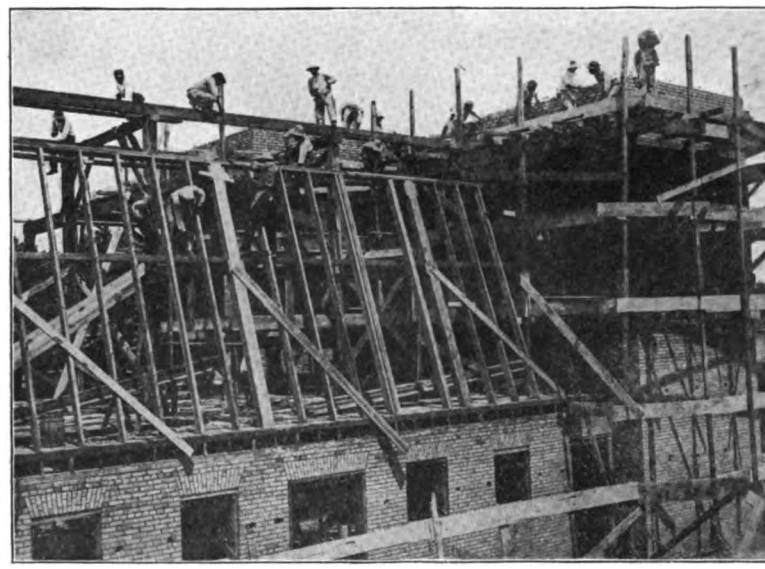
Such students are expected to spend all their manual training time at their trade unless special academic work is considered more desirable.

The work of the senior year is entirely elective. It may be any form of the regular manual training best suited to a particular case or it may



TRADE SCHOOL WORK. BUILDING THE SCHOOL BARN. CARPENTRY AND BRICK-LAYING CLASSES ASSISTED BY MANUAL TRAINING STUDENTS.

be special work with a view to teaching. This special work includes practice work in teaching manual training in the Institute or in the public schools and evening schools of the neighborhood. It also includes short courses of practical manual training suitable for the rural schools, such as chair repairing and caning, corn-shuck mat making, and repairs to the fences and homes of the old people in the vicinity.

(b) Manual Training for Girls.

Time—Two eighty-minute periods a week for four years.

The principal object of the manual training for the girls is to enable them to make good homes and to prepare them for industrial teaching. The time is equally divided between cooking and sewing for the first two years. Apart from this class work, all the housework in the girls' dormitories and teachers' rooms, including chamber work, sweeping, dusting, and scrubbing is done by the girls. In the school's steam laundry the

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girls do all the washing and ironing for the Students' Boarding Department and the Teachers' Home.

During the first two-and-a-half years each girl has received a good training in hand and machine sewing and in general housework and

TRADE SCHOOL WORK. BLACKSMITHING AND WHEELWRIGHT DEPARTMENTS.

cooking. Half of the third year is spent in household handicrafts. These include simple carpentry, glazing, painting, paper-hanging, and whitewashing. The object of this course is to make it possible for girls to do ordinary repairing, and enable them to keep their homes neat and attractive. Mattress making, chair-caning, and other branches of upholstery may be added to the above subjects if required.

The work of the senior class is drafting and dressmaking. Every young woman who graduates from Hampton is capable of drafting and making her own dresses and garments.

Girls in the upper classes, all of whom have had instruction in cooking, are detailed on their work days to the teachers' kitchen where they assist in the preparation of the food for the teachers' dining-room.

THE RELATION OF THE MANUAL TRAINING TO THE TRADES.

It will readily be seen from the foregoing plan of work that the manual training bears a very close relation to the trades,—so close indeed that the work of the two departments differs in degree only. A manual training student actually learns a limited amount of each trade he en-

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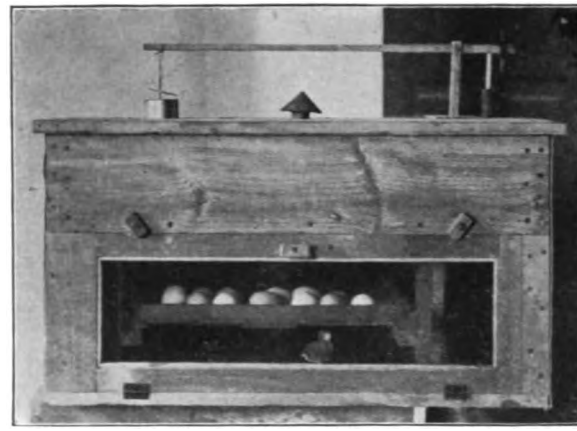
gages in during the academic course, which must add to his industrial usefulness.

In regard to this close contact between the academic work and trade work the school authorities and those in charge of the manual training are in perfect agreement with the expressed views of General



INCUBATOR MADE BY CLASS IN SCIENTIFIC AGRICULTURE. POST GRADUATES.

Armstrong. They believe that in its adaptation to practical life lies its chief value to the student.

The height of industrial usefulness is the possession of a trade—the term being used in its broadest sense,—therefore the more practical and useful the manual training becomes the nearer it must approach to trade work in its nature. The students go into the different trade shops, work side by side with the trade students, have the same instructor and have similar instruction. In this way they see and apply good trade methods and work with the actual thing and not a substitute as must often be the case in the academic classroom.

In answer to those who may question the pedagogical and ethical value of such instruction it may be said that mental and moral development is as much a part of the trade course as of the academic course, since character building is the chief aim of each department. In this respect, also, there is the closest relationship between the manual training and the trades.

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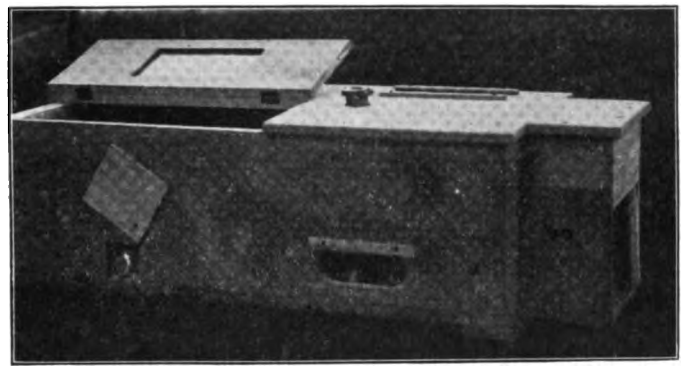
WHAT THE TRADE WORK IS.

The trade school is for boys only. All students in the trade school receive instruction in their trade eight hours each day and attend the night school. When necessary, one day each week may be taken for a work day. A student beginning his trade upon entering the school is likely to need during his first year, besides his entrance fee of twenty



BROODER MADE BY A CLASS IN SCIENTIFIC AGRICULTURE.

dollars, from seventy-five to eighty dollars in cash for school expenses. Student labor is paid for according to its value and the earnings of the students are held as a bond for the fulfillment of their purpose of getting an education at the school, and can be used only for their support while there. As it is impossible for trade students to earn money at their trades during the first part of the course the work day is allowed which can be spent in unskilled labor outside the trade school.

The trade courses are blacksmithing, bricklaying and plastering, carpentry, cabinet-making, harness-making, machine work, painting, printing, shoemaking, steam-fitting and plumbing, tailoring, tinsmithing, upholstery, wheelwrighting.

Students taking full courses in 1906-7	248
Students taking special courses	7
Agriculture students taking special courses	9
Manual training students	71

Each trade course requires three years. Lectures are given on topics connected with each trade. On completing the course a certificate is given for attainment of skill, rather than for length of service. To the postgraduate students who are taking a three years' course in

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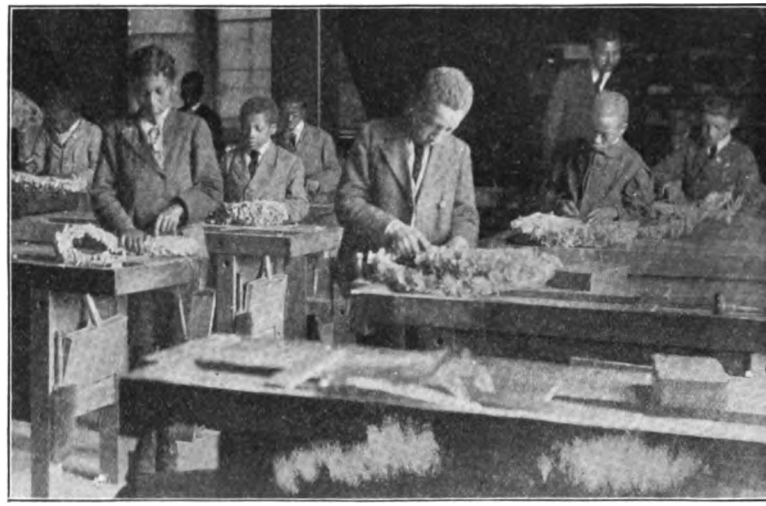
scientific agriculture, short courses are given in those trades most needed by the farmer. Included in these are carpentry, harness-mending, wheelwright and blacksmith work, bricklaying and farm mechanics.

Nearly all of the work of the Institute and much outside work is done by the trade students. This includes the erection and repair of the school's buildings, numbering sixty-five in all. The outside work consists chiefly in cabinet work, wagon and truck building and harness-



WHITTIER TRAINING SCHOOL. CORN-SHUCK MAT MAKING.

making. The uniform suits for about four hundred students are made in the tailor shop. All this work is valuable to the student as it brings him into keen competition with the various industries. A trade course includes, in addition to short courses in kindred trades, some work in mechanical and freehand drawing bearing especially upon the trade engaged in.

THE EFFECT OF THE MANUAL TRAINING UPON THE TRADES.

The effect of the manual training upon the trades is felt in several ways. The most noticeable one is the special help it gives to a student who afterwards takes up a trade, for the trade instructors report that those students who have had manual training can be relieved of much of the preliminary work, and in some cases, of the greater part of the work of the first year of the course. The trades are affected in no small de-

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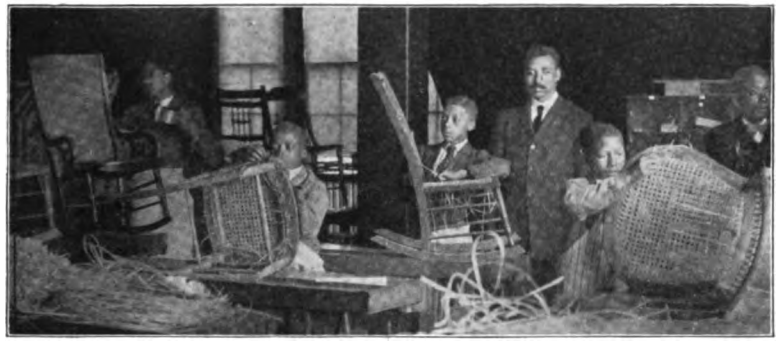
gree by the manual training having created a sentiment in the student toward manual labor which has directed him to a trade.

Again, through his manual training a student is often enabled to select a trade for which he has special ability instead of following one from mere fancy. A student seldom changes his trade after starting it, and the facts warrant the belief that this is largely due to his con-



WHITTIER TRAINING SCHOOL. CHAIR REPAIRING AND CANING.

tact with the trades through the manual training. If we may include agriculture and animal industry under the head of trades, the effect upon these subjects is just as pronounced. A knowledge, limited though it be, of painting, glazing, machine and harness-repairing surely makes a more intelligent and self-reliant farmer.

A problem worked out by a former class in agriculture may emphasize the point. The class was studying incubation at the time and an incubator seemed to be a suitable though ambitious thing to make. Disused materials were obtained wherever possible and a few things bought. With these and their manual training experience, the students completed an incubator and brooder. The metal bars for the thermostat and a few simple things cost one dollar and twenty-five cents—the entire cost. The incubator held sixty-three eggs, fifty-five of which were hatched and forty-eight chickens grew to broiler size. This practical application of the knowledge gained through the manual training must have had a good effect upon these students by showing them what could be done with cast-off materials. If these methods were applied to their farming, the manual training might justly claim a part in their success.

So far we have been dealing with the Institute proper, yet a description of the manual training would not be complete without including the

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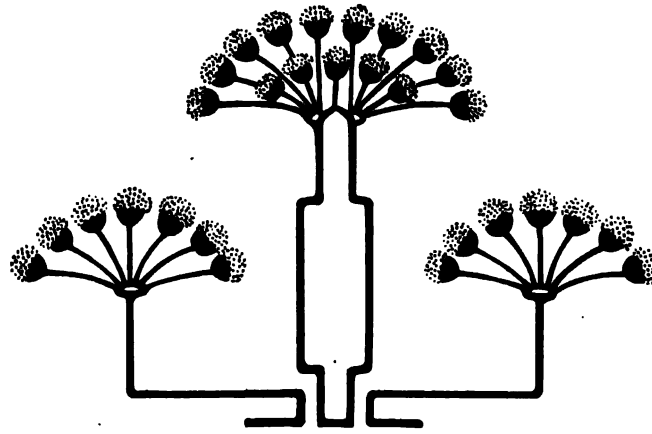
work at the Whittier School, a graded public school which is used as a training school for teachers. Though a public school, it is mainly supported by the Hampton Institute and is always considered a part of the system.

The manual training of the kindergarten and the first three grades includes clay, wood and paper as mediums of expression. Above these grades the work is of the same practical form as at the Institute, sewing, cooking, washing and ironing for the girls, mat-making, chair repairing and caning, repairing furniture, repairs about the school, and benchwork for the boys. Every pupil has a plot of land and devotes two periods a week to gardening, studying the planting, rotation and harvesting of crops.

In giving this account of the manual training and industrial work at Hampton Institute the writer has confined himself to the narration of simple facts, leaving to the judgment of the reader the wisdom of teaching this practical kind of work. The emphasis given to its useful side does not in any way diminish the attention given to mental and moral training, all of which must be combined in order to produce a properly educated student. While this practical training is considered the best for the students at Hampton, it is clearly seen that such instruction cannot be given in all schools. The Hampton manual training student is especially fortunate in having a trade school under the same administration where he can obtain such valuable experience.



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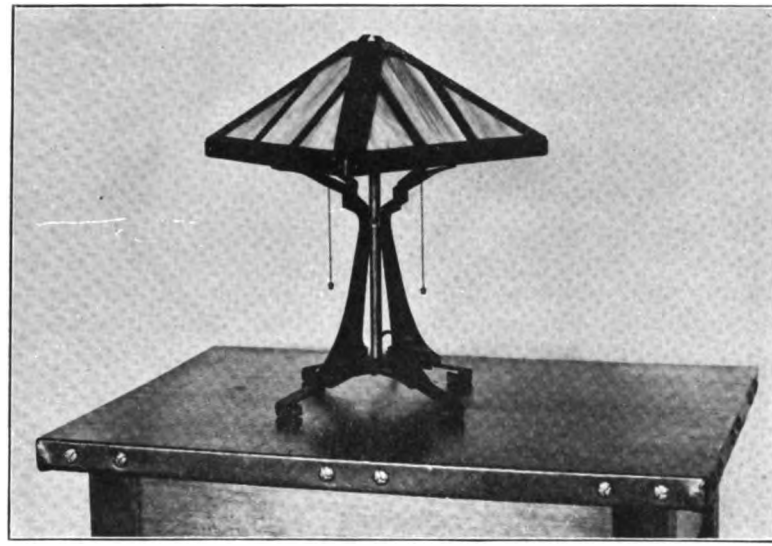

THE ORGANIZATION OF MANUAL TRAINING IN THE HIGH SCHOOL—III.

GILBERT B. MORRISON.

IT WILL be the purpose of the present article to call attention to the drawing of the mechanical arts course as shown in outline in the tables accompanying the series of exercises in the mechanical arts, to touch briefly the development of drawing from its educational side, and to present, with a few comments, an outline of work as at present done in forging and sheetmetal work which occupies the whole of the third year.

The tendency to draw has manifested itself ever since we have any history or record of the human race. The first relics indicate that man was a contemporary of the gigantic mammals of the Champlain period, a time so remote that we have no record of it in years. The stone implements such as arrow heads, hatchets, shells, and ivory had upon them markings, carvings, and rude drawings. These illustrations were mostly of animals and men contemporaneous of the period. While rude and primitive, some of these drawings show considerable artistic ability. In the cave of La Madeline in southern France was found a good representation of an elephant of the period (elephas primigenius) engraved on ivory. The lines of this engraving show that the

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knack of drawing possessed by the born artist, and which appears occasionally as an untaught instinct in man, revealed itself in the earliest human relics. This drawing was probably made during what is known as the reindeer era which succeeded the stone, or paleolithic age.

The spontaneous efforts of primitive men and children to represent the actualities within their horizon of observation should furnish us a key to the proper method of development of drawing as a means of education, but like other subjects and other means, drawing lost its spontaneity and naturalness when it got into the schools. This attempt to depict striking things furnished an effective means for producing a greater accuracy and completeness of observation of real things, but instead of fostering this tendency in the schools the subject of drawing was introduced by a monotonous and meaningless system of copying lines. Instead of encouraging this early tendency of children to gain command over their fingers and to acquire elementary notions of likeness without interference, a formal grammar of form was substituted, and instead of interesting natural objects the child was given a drawing book which consisted mainly of definitions and illustrations of "simple lines," "straight lines," "curved lines," "oblique lines," "horizontal lines," "vertical lines," etc., etc. This dry abstract analysis of the elements of subjects has been a sort of incubus in our schools for many years. Instead of natural methods from concrete to abstract the order has been reversed. The learning of foreign languages was begun by a drill in grammar. Science was introduced by definitions and "principles"—by a *grammar* of natural law. It is not strange that drawing was little more than a grammar of form. While these practices are not wholly extinct we are happily passing from them to natural methods.

The introduction of manual training called for a new interpretation of the function of drawing and there has been a movement amounting almost to a revolution in the method of teaching art. In the place of the formal method of teaching drawing by rules, and by teachers regardless of their qualifications for this work there was substituted the artist who carried to it something of reality—some of the spirit of art and truth. Drawing became a means of expression and industrial art took the place of much of the thoughtless copying of classic abstractions. This spirit grew and branched out in many directions. Adapted to the different grades and the varying ages and capacities of children, it appeared as color work, still-life drawing, designing, model-

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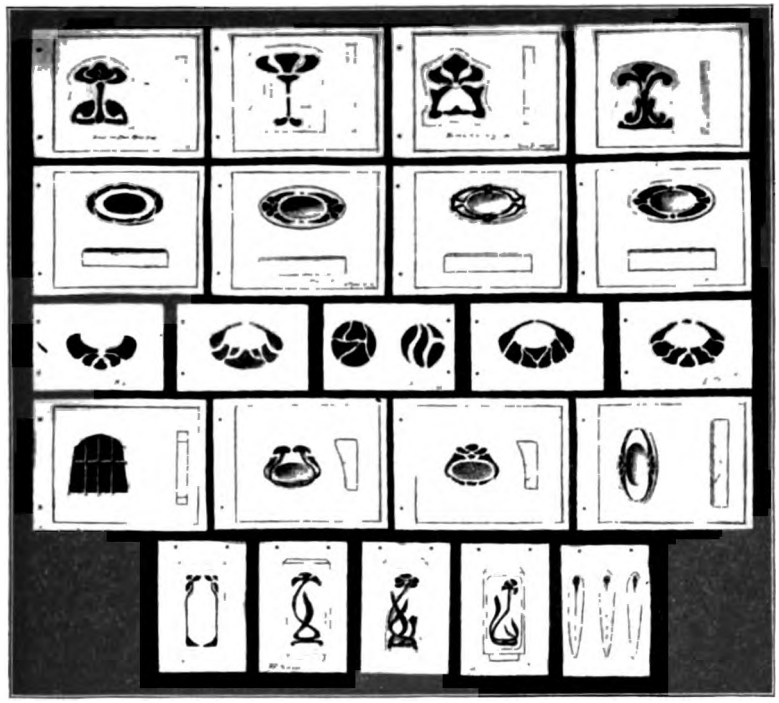
ing, decorating, and the various forms of construction work of a non-mechanical character. This movement has done much for the children of the grades in giving them partial relief from that process of word learning which was so much overdone in the schools of twenty years



EXAMPLES OF WORK IN DECORATIVE DESIGN.

ago and which is still in vogue in some schools. Placed under the influence of this work the children drew their elements and units of design, sometimes from nature, and sometimes from the art and handicraft of the Indians and other primitive peoples.

It seems proper that this work should be given to the children of the primary schools. They are of an age which corresponds to that of the race and to that form of civilization that preceded the mechanical. It cultivates the taste, the imagination, and exercises the co-ordinating power between the hand and the head, and it has a place in domestic arts courses in the high school. The spirit of the new art movement has taken absolute possession of the schools in some of our

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leading cities, and it will perhaps have to be admitted that like other good things long delayed and finally under way, it is being somewhat overdone. This is especially true in its attempted application to or substitution for mechanical drawing and the mechanic arts. This movement, in the ecstacy of its new being, found expression in sayings like these: "Teach the beautiful, the useful will take care of itself." "It is not so much to make beautiful things as to make things beautiful." These phrases sound well and properly interpreted convey certain truths; but as they have been employed to depreciate and belittle certain essentials and processes not in themselves related to art as a conception, they have done their share of mischief in beclouding and obstructing progress, and in diverting the attention from the larger significance of manual training. It is, of course, admitted that the artistic spirit pervades all good work taken in its aggregate. But it cannot be admitted that all processes in mental or constructional acquisition can be accompanied by art at the time they are performing their true educational function. The chief value of manual training lies in the skill acquired in the mechanical operations as I have before pointed out. The real use of art in its application to the mechanic arts is in designing the form, and in decorating the surfaces of the articles made. As this is very important, we give one period a week to designing throughout the course. The illustration of finished projects shown in these articles and the accompanying designs will give some idea of what we are doing.

Thus far considered the purpose of drawing is aesthetic. The love of beauty, of harmony, and of proportion is a constant stimulus in making everything as beautiful as we possibly can, and how much effort in this direction is needed is only too plainly revealed everywhere in the commercial articles on sale in our stores and shops.

I now turn to another kind of drawing through which runs a different purpose. Mechanical drawing like that of art and freehand drawing has had an interesting evolution. From mere thoughtless copying from a model drawing, which has little value beyond the practice given in handling instruments, the mechanical drawing course has so developed that it now combines several distinct functions. 1. It furnishes a training in the use of drafting instruments. 2. It gives the student interpretive knowledge and skill in making and applying constructional drawings which necessarily precede all his exercises in the mechanical arts of which they form an essential part. 3. It gives

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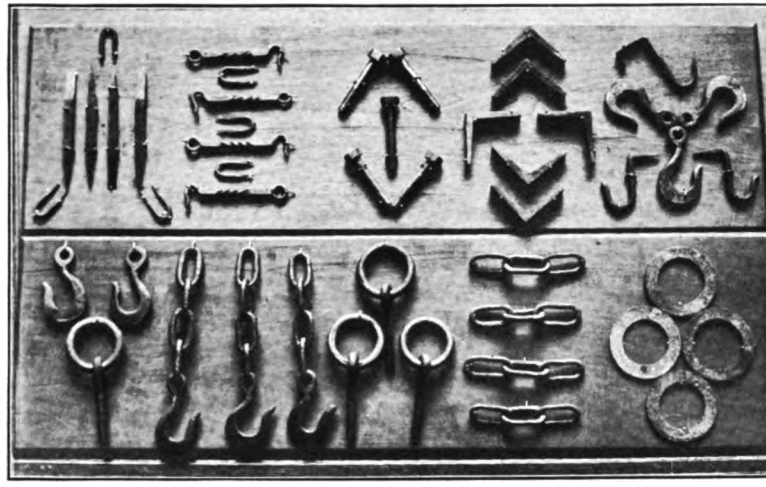
practice in freehand sketching of objects to be constructed or to be remembered—a function indispensible to the practical man who needs a ready and effective medium of expression and communication in the making of plans and specifications etc. 4. It furnishes weekly practice in constructional and decorative design which is constantly applied in the workshops. 5. It gives a developmental course in descriptive



FORGING EXERCISES.

geometry by a series of logical steps which makes this a very easy instead of a very difficult subject. The problems and exercises outlined in the accompanying tables are worked out with comparative ease by all pupils taking the work. As this phase of mechanical drawing is not usually seen in a secondary school, and as its practicability is liable to be questioned, it may not be improper for me to say that I am not describing a theoretical course but am giving only what is actually being done.

These drawing problems are to abstract descriptive geometry what empirical or constructional geometry is to demonstrative geometry. All transitions in education should be made incidentally and not formally, and the relationship to constructive art should always be maintained. A pupil who has had constant practice in dealing with relationships of form and quantity will come later to the demonstrations of Euclid or to the problems of descriptive geometry with faculties well disciplined for abstract reasoning.

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For the development of this phase of our course in mechanical drawing credit is due to Mr. Arthur J. Burr. As it will be of some interest to teachers of mechanical drawing, I shall present a brief description of it substantially as directed by Mr. Burr.

First Year. Since lettering occurs on all drawings, only about two or three weeks are given to a small sheet of simple freehand and instrumental lettering at the beginning of the course, after which no special sheets on lettering are introduced, though many styles of instrumental lettering are given on the blue-prints used in the second and third years.

Following the lettering, freehand orthographic sketches of simple geometrical objects and shop exercises are made, and from these, practical working drawings are executed in ink. The "third quadrant" (which is previously explained to the pupil by means of drawings and "co-ordinate planes,) only, is used in the first year. As soon as the pupil has acquired sufficient ability in working out orthographic projections, he is required to make assembly and detailed drawings of a simple tool, globe valve or other simple mechanical device, and finally to design some simple thing which he may or may not construct in the shops. This completes the first half of the first year.

Isometric and cabinet projections are taken up during the third quarter of the first year in which the pupil's drafting desk is drawn in cabinet projection, tinted and grained. The last quarter of the year is given to freehand drawing in pencil and charcoal from objects.

Second Year. In the second year, an elementary course in descriptive geometry (the basis of all mechanical drawing) is given. It is introduced by means of simple isometric drawings which show the relations between planes and their traces, and between points and lines and their projections upon the co-ordinate planes in a sort of picture form, and from this they are developed into the pure orthographic form. Three sheets cover this method of treatment, after which simple descriptive geometry problems are taken up, followed by conical sections, intersections of curved surfaces, line shading (treated in a new and somewhat rigid way) shades and shadows and linear perspective.

All problems in this year are presented on incomplete blue-prints which are supplemented by models when necessary. This method presents the problems with the minimum amount of laborious lettering, aids the pupil in getting started, saves time in arranging the drawing upon the sheet, saves paper, prevents the pupil from blindly copying the results required, gives the teacher an opportunity to explain the problem

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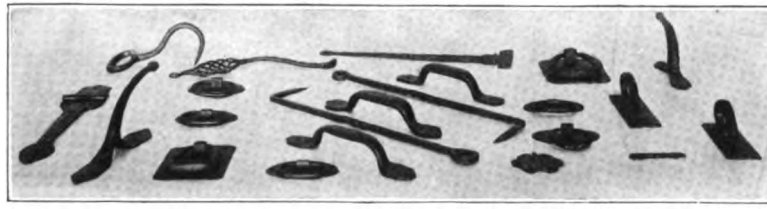
before the pupil begins, and furnishes the teacher something tangible to explain. This second year work is the most important in that it gives the theory and principles of mechanical drawing, and hence a broader view of the subject. It prepares the pupil for the most difficult practical drawing he may be called upon to make and gives him an excellent preparation for any subsequent and more advanced college course in descriptive geometry.

Third Year. (a) Machine Drawing Course. At the beginning of the third year, the cycloid, the spirals (including the involute) and the helix are given preliminary to the drawing of such elements of



ART APPLIED IN FORGING EXERCISES.

machines as cams and gears, which require special treatment, and which depend upon these curves for their construction. These are presented in a manner similar to that employed in the second year. This arrangement makes it possible for the pupil to understand and draw almost any machine or part of same that may be required of him. This phase of drawing completes the third year's work.

(b) Architectural Drawing Course. At the same time the machine course begins, the architectural drawing course is taken up by pupils who prefer it to the machine drawing. This course consists of architectural lettering, pen-and-ink rendering, brush rendering, drawings illustrating methods of representation of plans, elevations and details as used in architectural practice. The classic orders are taken up in the last portion of the year.

Fourth Year. (a) Machine Drawing Course. At the beginning of the fourth and last year, working drawings—both assembly and detail—are made from machines selected by the teacher. The last part of the year is given up to machine design.

(b) Architectural Drawing Course. At the beginning of the fourth year the classic orders are continued while the remainder of the

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TABLE VII.—FORGING.—THIRD YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
	Materials. 1. Lectures on			
	2. Management of Forge and Fire.	General Blacksmithing.		
	3. Drawing Out.	Stock Reduction.	Wedge.	
	4. Bending.	General, in Application.	Meat Hook, Spanner Wrench, Split Link, Gate Hinge, Staple.	
1st	5. Twisting.	Twisting.	Gate Hook, Poker.	
	6. Upsetting.	Enlarging Stock.	Bolt Heading, Angle Iron.	
	7. Splitting.	Splitting.	Fork, Drawer Pull, Grapnell.	Constructive Design.
	8. Punching and Forming.	Eyes and Small Openings.	Hasp, Chain Hook, Trace Link, Finger Plate Hinge, Door Plate.	Constructive Design.
	9. Fullering and Swaging.	Spreading out Stock. Stock reduction. Rounding.	Eye Bolt, Hat Hook, Door Plate, Door Knocker, Shoe Scraper.	Constructive Design.
	10. Use of the Power Hammer.	Heavy Forging.	Tongs, Connecting Rod, Crank Shaft.	
2d	11. Use of Power Shears.	Shearing Stock.	Plates and Similar Sheet Metal Work.	Constructive Design.
	12. Welding.	Joining, Building Up.	Rings, Ring and Eye Bolts, Chains, Grapnel Clevis.	
	13. Case Hardening and Annealing.	Hardening and Softening Surfaces of Iron.	Screw Threads, Small Castings, Small Forgings.	
	14. Lectures and Notes on Steel.	All Steel Work.	All Steel Work.	
	15. Tool Making and Dressing.	Working with Steel.	Four Hand Tools, Seven Lathe Tools.	
3d	16. Hardening and Tempering.	Metal Working Tools, Bushings, Rock Drills.	Four Hand Tools. Seven Lathe Tools.	
	17. Assembling.	Putting together Work composed of several parts.	Chain and Hook, Lantern Hanging, Bracket and Table Lamps.	Constructive Design.

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TABLE VIII.—ART-CRAFTS METALWORK.—THIRD YEAR.

(Tin, Copper and Iron.)

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
4th	1. Lectures on the Materials and Operations.	General.	All Exercises.	
	2. Development of Flat and Curved Surfaces.	Sheet Metal Work. Tinsmithing.	Tin Cup, Tea Pot, Match Safe, Stamp Box, Box Corners.	Constructive Design.
	3. Beating out.	Stretching and Forming Sheet Metal.	Tray, Ladle, Porringer, Ink Pot.	Constructive Design.
	4. Cutting and Sawing.	Cutting Openings in Sheet Metal, Stock Preparation.	Escutcheons, Hinge Tails, Drawer Pulls, Box Corners, Finger Plates.	Constructive Design.
	5. Forming and Filing.	General.	Blotter Block.	Constructive Design.
	6. Riveting and Soldering.	Joint Making.	Match Box, Sconce Stamp Box, Bonbon Box, Venetian Iron Work.	Constructive Design.
	7. Finishing and Coloring.	Art Metal Work.	All Exercises.	

year is given up to the design of a house or other building, working drawings of plans; elevations and details being required with perspective drawings also in some cases.

On account of the wide difference in the ability of pupils, two courses known as "major" and "minor" are given. The major course is as above described, while the minor course consists of the first three years of the major course completed in four years.

The accompanying cut shows a few decorative designs for the "book rack" and "pin tray" on which the classes are at the present time working.

The work in forging which occupies the student's time during the first three quarters of the third year is shown in Table VII. As this work gives free play to all the student's faculties it is probably the

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TABLE IX.—DRAWING.—THIRD YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Design
1st	1. (a) Linear Perspective.	Architecture.	Principles, and Cottage.	
	(b) Design.	Metal Work.	Design of Hasps, Door Knocker, Shoe Scraper, Finger Plate, etc.	Form Design.
2d	2. ((a) Special Curves used in Machine Parts.	Screws, Cams, Gears, etc.	Ellipse, Cycloid, Spirals, Helis, etc.	
	(b) Design.	Metal Work.	Design of Hat and Coat Hooks, Door Knocker.	Form and Decorative.
3d and 4th	3. (a) Parts of Machines, Requiring Special Treatment.	Machine Drawing and Design.	Cams, Cycloidal, Involute, Bevel, and Worm Gears.	
	(b) Design.	Metal Work.	Design of Lantern, Hanging Brackets and Table Lamps, Cups, Pots, Match Safes, Box Corners, Stamp Boxes, Trays, Ladles, Porringer, Ink Pot, Blotter Blocks, Sconce, Bon Bon Box, Venetian Iron Work.	Constructive and Decorative.

most valuable part of the course. With hammer, tongs, anvil, and a forge fire the student must express himself through a refractory iron medium. After the requirements laid out in the shop drawing are studied and understood, the work on the exercise requires concentrated attention, alertness, quick and steady movement, vigor and physical strength. The life at the forge is stimulating, interesting and strenuous. The boy must "strike while the iron is hot" and strike right or he will not reach the desired results. All the exercises in the forging course are practical, useful articles. This fact secures interest at the start. From a simple wedge, staple, hook or poker to ornamental

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lanterns, brackets and lamps the course furnishes a complete, flexible series of exercises which gradually increase in difficulty and complexity. There is something particularly human in the work of the forge, and its articles when artistically designed and skillfully wrought are always in demand when aesthetic effects are desired. No machine-made hardware can take the place of forged trimmings in giving pleasing effects to articles of household furniture. They always suggest enduring strength, and can be exactly adapted to the particular place and function for which they are intended.

The work of the fourth quarter consists of exercises on sheet metal. Though not equal to forging in its educative value, it has many points of merit especially as it requires skill in constructive design.

The last number of this series will contain, along with tables of fourth-year work, a discussion of industrial education in its relation to the high school.

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A COLLEGE COURSE IN CONSTRUCTIVE DESIGN—II.[1]

CHARLES R. RICHARDS.

PROBLEM IV. The proportions of a box are of course determined largely by the nature of its intended use—its contents and the place it is to occupy. In the case of small boxes, such as those often made in schools, it is nevertheless generally possible to adjust the relative dimensions within a greater or less margin without affecting the functional result.

The fundamental form effect of a box, or chest or table or any other piece of furniture, is first a matter of the proportions of the front or commonly seen view and then the relation of this outline or mass to the other views of which one or both are generally seen in conjunction with the first. Here as in the wainscot or door panels an agreeable effect is gained by a harmonious relation of spaces accompanied by variation in form. A box with a square end is not as pleasing as one with varied dimensions, not only because of lack of interest in the end view but because of the sameness in top and front views.

In the case of a box resting on a table, bureau or desk, the relation of the top and front views is evidently of the most consequence. The proportions of the end however are important not only in connection with the other views but on account of the influence these proportions exert upon stability of appearance and consequent restfulness of effect. These qualities are often lost by making our boxes too high in proportion to their depth.

The Japanese with their endless variety of boxes for all manner of purposes are very happy in this matter and turn out countless specimens that seem quite independent of surface ornament for their charm.

For the sake of concreteness this problem is given as the design of a

[1]The first article in this series was published in the December number.

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box for some specific purpose such as a glove box, a jewelry casket or a box for drawing instruments with a definite cubic capacity. Students designs are shown in Figures 15 to 17.

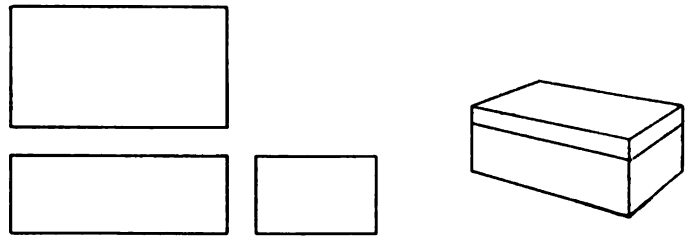

FIGURE 15.

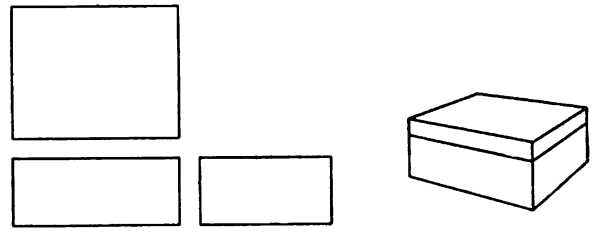

FIGURE 16.

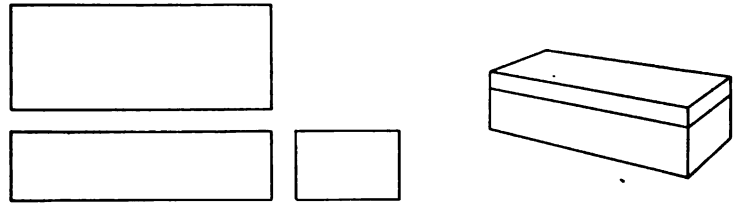

FIGURE 17.

Problem V. This problem deals with the design of a small box suitable for pencils or brushes with overhanging cover and bottom piece. The special elements in the problem are the thickness of the top and bottom pieces and the amount of overhang.

It is apparent from a comparison of cornice and roof projections in Greek temples and other low buildings and in those of modern office buildings that the amount of overhang in these features is a matter of

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relation to the height and width of structure—the long low building demanding shallow far projecting eaves and the tall office building a high but relatively narrow cornice.

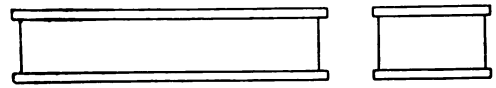

FIGURE 18.

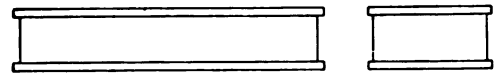

FIGURE 19.

These features perform the same aesthetic function as the overhanging edges of a simple box and although it seems a far cry from such a structure to a classic temple the proportions of the latter may be studied

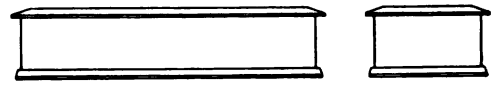

FIGURE 20.

FIGURE 21.

with much profit in this connection. By comparing the effect of equal projections on the front and end views of a long and narrow box the above form relation will be very evident. When there is much differ-

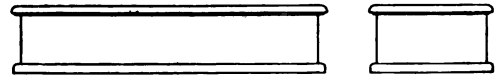

FIGURE 22.

ence in the width of the two views a projection suitable for the front will almost invariably be too great for the end.

Variation of overhang is a refinement rarely attempted in small boxes and one that is practically not important because the box is seldom seen directly on end but the comparative study of the two views serves a useful purpose in bringing out the relation of overhang to the primary form.

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In the case of tables, however, where the amount of overhang both front and side is an important item in the effect the desirability of variation is generally recognized and in long tables the projection of the top at the ends is almost always greater than at the sides.

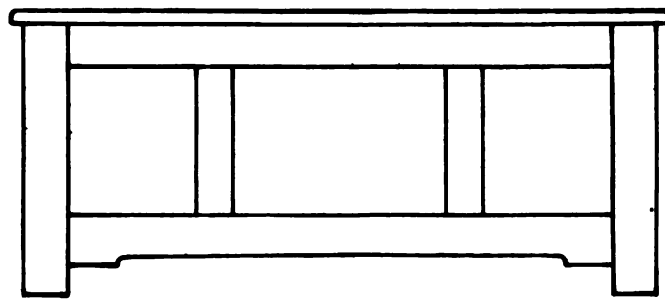

FIGURE 23.

Problem VI. This problem considers the modification of the square edges of the previous box by mouldings suitable for soft wood and for such a simple piece of construction. It is evident that such modifications to be appropriate must be very simple. It is also evident that the treat-

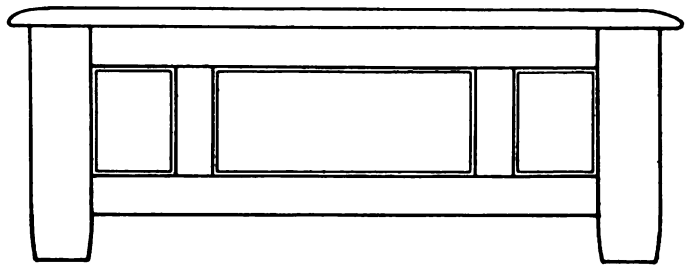

FIGURE 24.

ment of the cover should be in harmony with that of the base and yet not simple duplication. Various combinations made up of simple chamfered and rounded edges are possible and a few of these are illustrated by the designs shown in Figures 20-22.

In Figure 20 the attempt has been made to secure unity through equal depths of chamfer with a result rather formal and rigid for such a small box. In Figure 21 harmony is sought by employing equal

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angles. In Figure 22 an agreeable relation of outlines is secured but with a treatment of the upper moulding that is perhaps over delicate for such a simple structure.

Problem VII. A chest with corner posts and panelled front presents

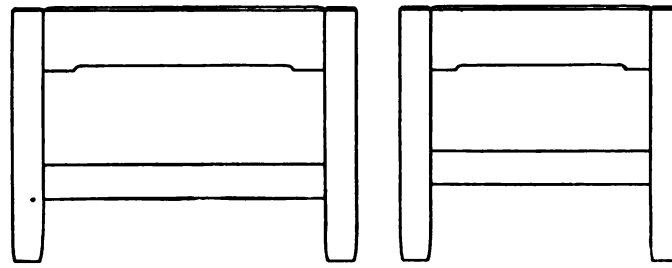

FIGURE 25.

additional elements of space division: vertically—the cover thickness, top rail, panel, bottom rail and clearance; horizontally—overhang of cover, posts, panel and style divisions.

To secure a pleasing front mass is the first consideration and then an

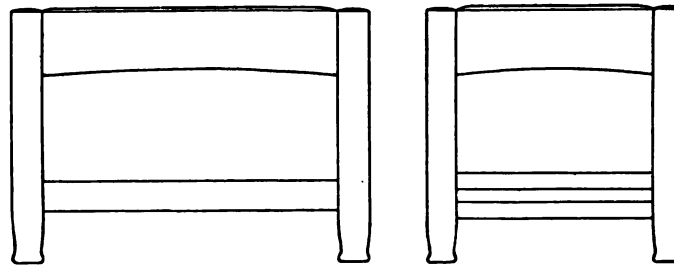

FIGURE 26.

agreeable breaking of this space by posts and rails and panels. The old form of Elizabethan construction that presents a post much wider than deep lends itself materially to this effect. A square post is almost invariably too narrow to balance satisfactorily the weight of the large central rectangle.

To avoid equality in the width of the two rails and the clearance space and yet preserve friendly relations is a nice problem of adjustment. The mouldings on the lid, which would be exposed to much wear, should evidently be simple and without projecting angles.

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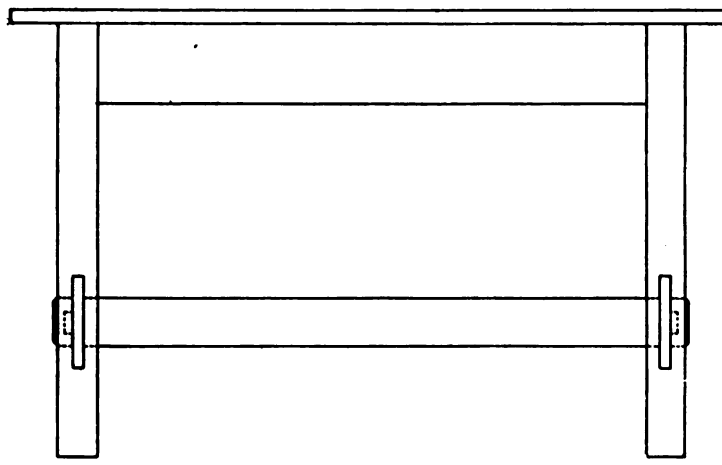

FIGURE 27.

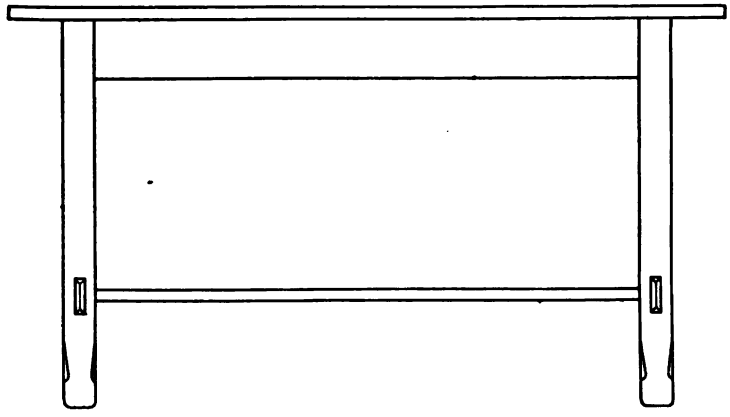

FIGURE 28.

Problem VIII. In a seat or large stool many of the elements of the previous problem are present. The proportions and division of the main rectangular mass are of course the chief consideration.

In a rectangular space broken by a heavy top rail and a lighter lower rail, a condition presented also in tables and chairs, a general similarity

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of proportion between the two rails and their underlying voids may add a pleasing element of rhythm and consequent unity to an otherwise meager design.

Many simple refinements may be introduced in the outlines of such seats which serve to relieve their plainness of effect and geometrical quality. The lower side rails for example may be placed at a different height from those of the front as in Figure 25, or divided into a number of parts as in Figure 26.

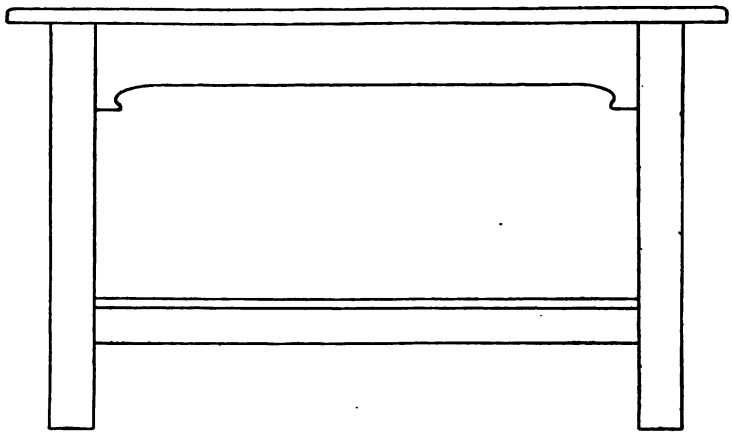

FIGURE 29.

Slight variations in contour in the upper rail and simple articulations of foot and top of the posts may be employed to good advantage. The main point to be considered in all such modifications is that the fundamental structural outline be preserved and that all variations be made distinctly secondary in effect and not of such eye-compelling quality as to become the prominent features of the design. The shaping of the feet in Figure 26 perhaps approaches the danger line in this direction.

Problem IX. A table with straight-line members for a small study or library.

Every piece of furniture has a certain dominant quality of form, proportion of parts, color or surface treatment which gives, or should give, a key for the treatment of every detail.

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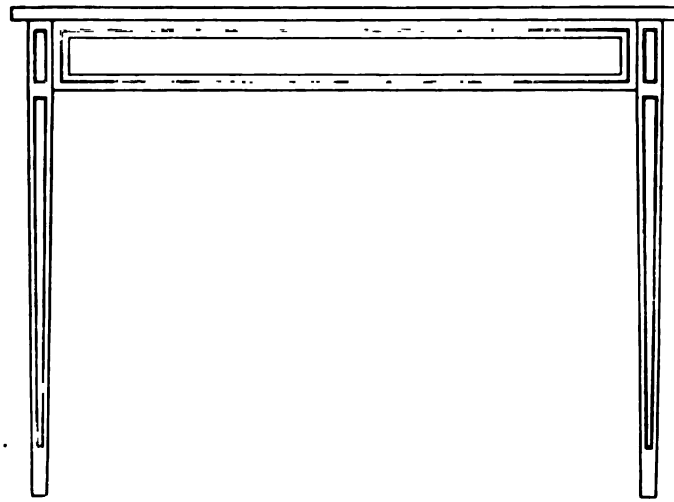

FIGURE 30.

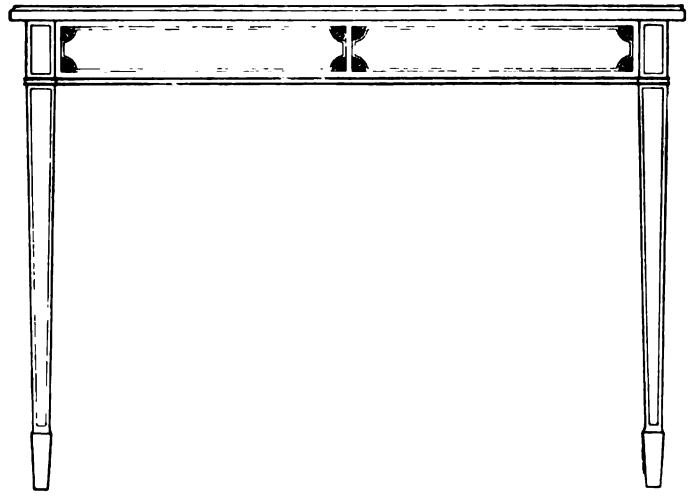

FIGURE 31.

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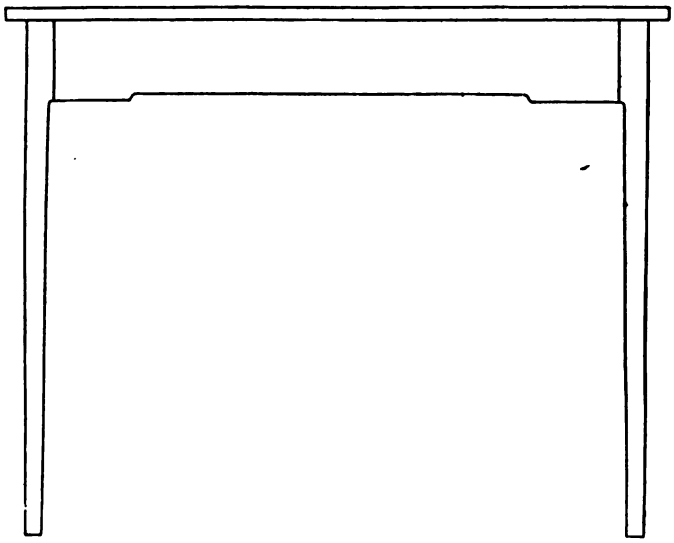

FIGURE 32.

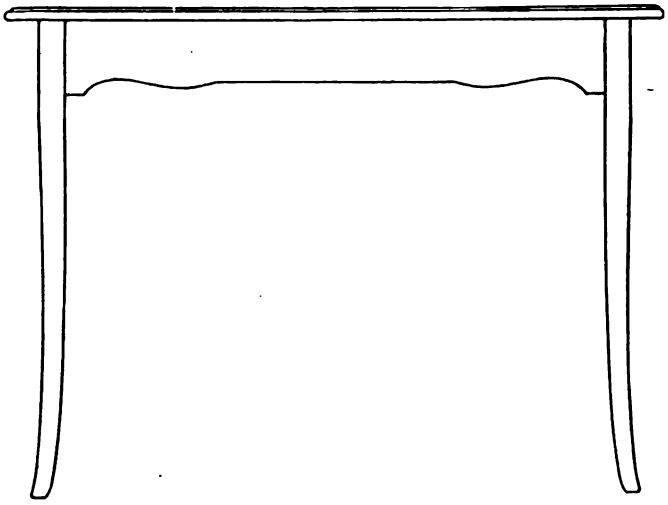

FIGURE 33.

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In the table suggested by the problem it is evident that the significant qualities are simplicity, strength and obviousness of structure. In such a table or other piece of furniture composed mainly of straight sided and square ended members interest of effect will depend more than ordinarily upon niceness of proportion and agreeable relation of spaces.

With such simple structures it is often desirable however to make use of other appropriate effects in order to develop greater character and interest of appearance. In the first place a strong grained wood such as

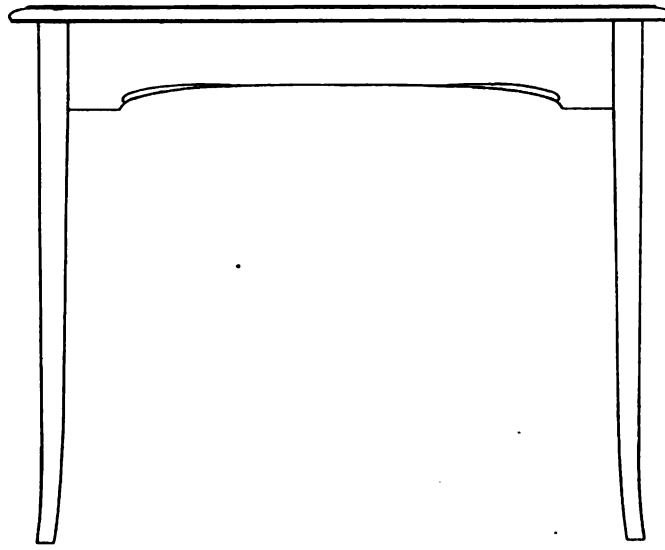

FIGURE 34.

oak may be used to add a pleasing texture effect to the broad flat surfaces. Furthermore the expression of structural details such as projecting tenon ends and keyed tenons may be made use of to add spots of interest to the plain surfaces and regular contours. And again an exaggeration of certain details such as the projection of the top may be employed to further escape the commonplace and gain strength and individuality of effect.

Problem X. A center table without lower rails or stretcher, suitable for a small living room.

Such a lighter table will be characterized by greater delicacy of proportion and refinement of detail. The exaggeration of parts and the

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constructive expression appropriate in the last problem would here be out of place.

With the lower rails omitted the tapered leg becomes necessary and with the reduction of surface areas the use of strongly marked woods is no longer so desirable. With straight sided members and the use of an even-grained wood like mahogany, narrow lines of low toned inlay have

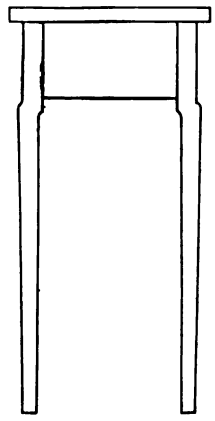

FIGURE 35.

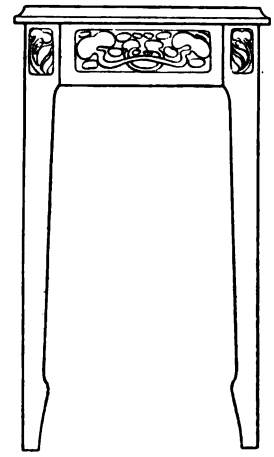

FIGURE 36.

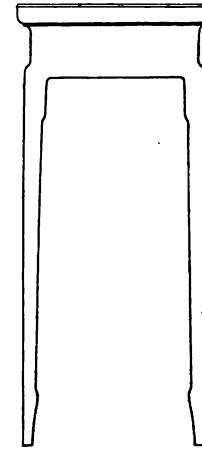

FIGURE 37.

commonly been almost the sole means employed to add further richness of effect to such tables. Figure 30.

In Figure 31 other elements of refinement have been introduced. In this design a one or three-part panel division of the rail might be used to advantage in place of the two-part arrangement shown.

When the contour is modified by a slight curved treatment the outline becomes the character-giving element and inlay is no longer appropriate. When any suggestion of curved outline is introduced into the rail and legs, the problem becomes largely one of flow of line and consonance of movement in the inner rectangle. The expression of this particular problem is of course seen at its best in the finer tables of the Louis XV period which stripped of their surface ornament remain in many cases exquisite examples of pure outline design.

Problem XI. In the ornament or plant stand there is less necessity for rigid adherence to structural form and more opportunity for inventive fancy than in more important constructions. Various pleasing

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modifications of contour especially in the supports may be made without losing the essential structural character of the outline. Figures 35-37.

In the type with sunken shelf above and a second shelf below, opportunities are presented for a rhythmic arrangement of the rails and also for a treatment of the enclosed void by connecting splats. In this latter connection care is necessary to avoid overheaviness of effect by the introduction of members either too numerous or too large for the space.

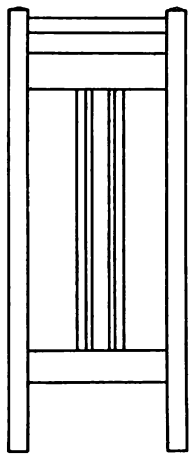

FIGURE 38.

Problem XII. A chair with straight lined members.

In even the simplest form of the conventional chair there are presented the two distinct problems of body and of back and at the same time the problem of relation between these two.

In the under body in all common types there are four legs connected by four top rails and by lower side rails and either with or without lower front and back rails or stretcher. This is a problem similar in most respects to the seat and the table.

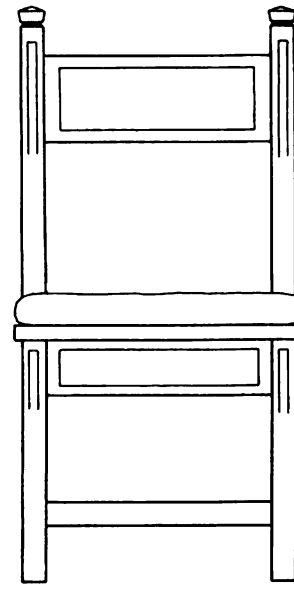

FIGURE 39.

In the back the rear legs are continued upward and in the straight lined types joined either by rails alone or by a combination of rails and splats. These members must be so placed as to give comfortable support to the back of the sitter and at the same time to offer a pleasing space arrangement of this upper rectangue.

In Figure 39 a chair of equal width is shown (a form that must always be heavier and more set in effect than the usual type) in which one deep rail is carried across the low back. To balance this heavy member the seat rail has been dropped and a shelf seat and cushion introduced.

To relieve the squareness and solid quality of the effect the surface has been broken by grooved lines and a strong finial placed at the top

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of the supports. The effect of this design would perhaps not be lessened if the bottom stretcher was omitted.

In Figure 40 a design of the more usual type is shown.

Such designs do not of course suggest the poetry of chair design. This is reflected in the exquisite and subtle relation of curved lines as ex-

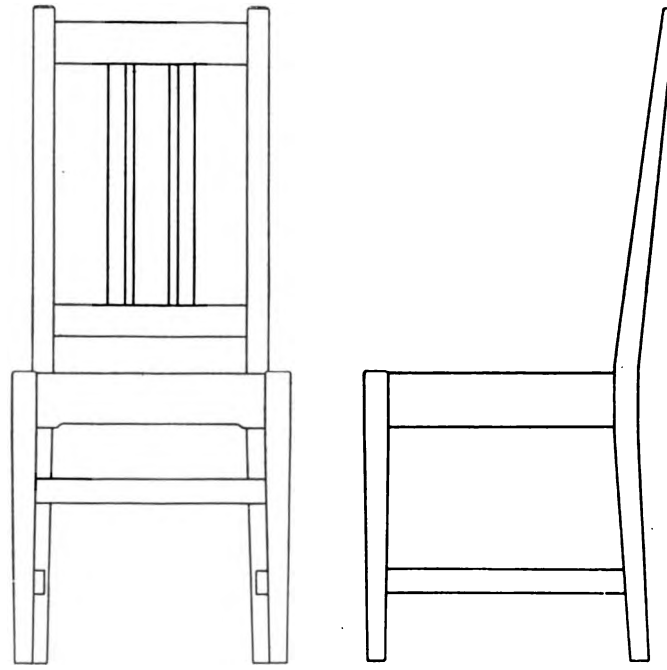

FIGURE 40.

pressed in the creations of Chippendale and Heppelwhite and the French designers of the 18th century. Such problems are however far beyond the range of a course of such limited character as the one under consideration.

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SAND TABLE WORK. YEAR I. SHOWING ELEMENTS OF THE PICTURE CUT OUT OF PAPER AND THE DETAILS MARKED WITH CRAYON.

A COURSE OF STUDY IN MANUAL TRAINING—II.[1]

CHESHIRE LAWTON BOONE.

THE play house which was discussed in the first paper, is a typical first-year project. It loses much of its interest for children by the second or third year. They can do more difficult and varied exercises, and their interests have multiplied.

SAND TABLE WORK.

The most adaptable and useful constructive agent during the primary period, is the sand table. Its possibilities are practically unlimited for any one of the first three grades because it introduces so many kinds of manipulation. In the first grade children have to learn the use of their fingers, of scissors and paste, and to learn to follow directions easily. As a beginning very simple buildings, as houses, barns, stores or churches are cut from stiff paper. These may be colored and details, as windows and doors, indicated with crayon or pencil. Figures, animals, wagons, lamp posts, etc. are cut out in the same way and a selection from all this material assembled on the sand table to represent a street, a house and yard, a chicken yard and the like. One can arrange in the same way illustrations of skating and sliding, the railway station, and representations of "Red Riding Hood," "Cinderella," or "Over the River and Through the Woods."

[1]Copyright, 1907, Cheshire L. Boone.

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With alert or advanced classes the cutting is supplemented with or even supplanted by objects in three dimensions, constructed by folding, cutting and pasting or by modeling in clay. (Eskimo Village.)

Sand table work introduces certain fundamental ideas in a direct way. It emphasizes the relative *sizes* of things—which is scale—and their relative positions, two items which are all important in the making of illustrative drawings. All drawings at this time should be of the illustrative kind and deal with the same subject matter as does hand work. For the second and third years, problems are desirable which will involve measurement and accurate workmanship, and which possess also the invigorating pictorial or story element; these exercises are in fact illustrations. Sand table work combines the two qualities.

For the present purpose a village street is chosen as a type, as it presents most of the possible exercises useful at the time. The project is worked out in paper.

As has been already suggested the topic must be presented by the class teacher, a bit at a time, studying first, buildings, then vehicles, fences, people, animals, etc., in order to *build up* a conception of the street as a unit by becoming familiar with the details of that unit.

In practice, typical exercises are taught in great detail, as dictational lessons. The class is encouraged to make then as many variations or additions as it can. These may be produced either in or out of school as seems feasible. As soon as enough material is on hand, the table is arranged and the houses, for instance, placed in position with proper surroundings—fences, sidewalk, trees, etc. As succeeding objects are finished, additions are made to the picture, changing parts of it if necessary to accommodate the new elements, but keeping before the class all the time the one idea—street or farm, etc. Moreover the detailed arrangement of the picture may be left so far as can be, to the class; they are to choose where the stores are to be, and the houses and church. It is their street.

The most satisfactory way to present these separate problems to the class is to place the drawing for any chosen one on the blackboard in the position in which pupils can most easily make the measurements. Each measurement should then be indicated by a dotted line, and then executed by the class, one line at a time, until the diagram is complete. The cuts are finally indicated by heavy full lines or by colored lines, the class following the building up of the drawing. In this way children learn to follow directions and follow them rapidly. As the class

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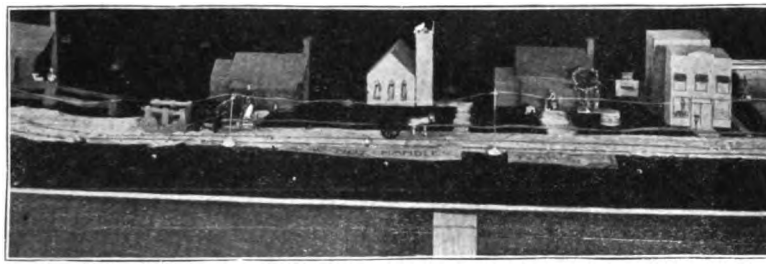
becomes familiar with objects developed on paper, it quickly comes to see how the construction is accomplished and to see that each fold has a definite use.

Once embarked on a sand table project the work should be kept moving until the task is completed. Every lesson need not be devoted to it, but every lesson ought to contribute toward the enthusiasm which the group of lessons inspires. Any normal class of primary age handles the sand table with skill and delight and the existence of apathy suggests



SAND TABLE WORK. YEAR II. SHOWING SOME OF THE CONSTRUCTIONS MADE FROM THE DIAGRAMS HERE GIVEN.

an indifferent presentation of the subject or an unfortunate choice of topic.

Whenever it seems desirable other media than paper may be used for all or part of the project. Clay is very necessary for figures, animals, for sidewalks, curbs, steps, foundations, etc. Sand and gravel may be needed for the road. White cotton or cloth makes splendid snow. Any evergreen will supply the material for trees and bushes.—The kind of material used is of slight importance. Any medium by which the expression of the idea can be facilitated is allowable, if one is careful to choose lines of work which will require media that are constructive in kind—that can be measured and used for accurate building. For this reason the Indian Village is poor matter for constructive purposes. It suggests very few exercises for school work, which can be made in a sensible way. The problems cannot be laid out easily.

The drawings and illustrations herewith offered give details necessary to carry out the work as indicated above. The diagrams admit of innumerable modifications. Many other problems may be devised along the same line. All buildings and all vehicles are very much alike as to the essentials of construction, but it is most desirable that the designs

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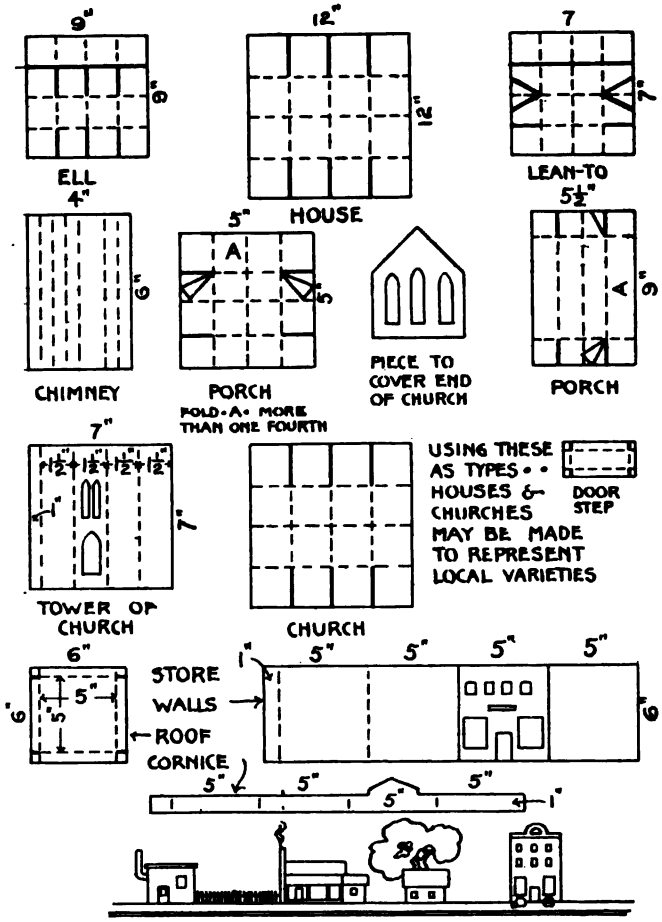
CONSTRUCTION

SAND·TABLE·PROBLEMS



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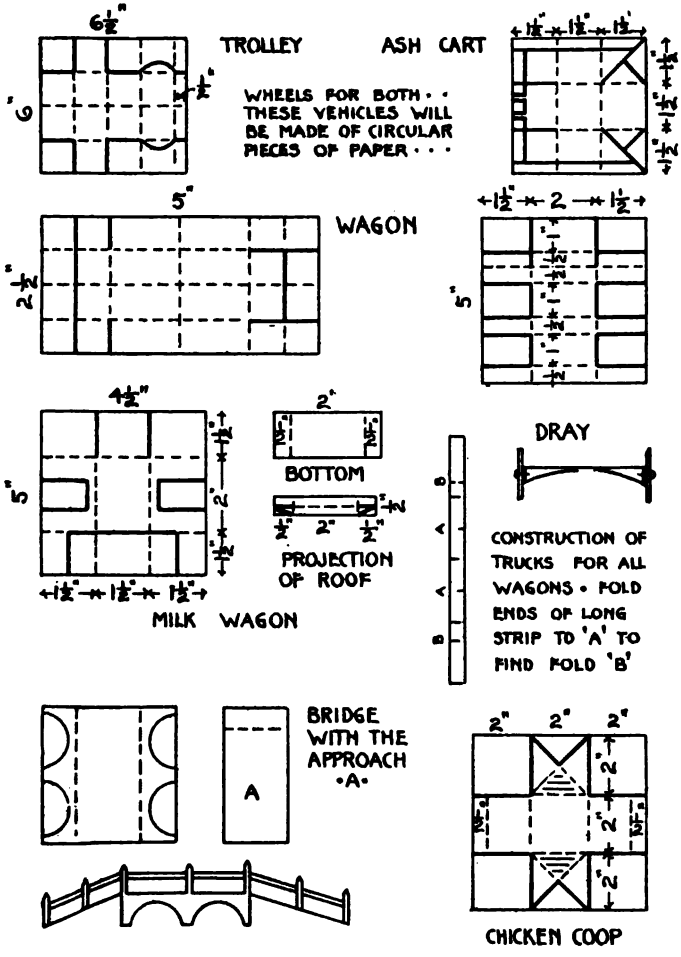
CONSTRUCTION

SAND-TABLE-PROBLEMS


TROLLEY
ASH CART
WHEELS FOR BOTH · · THESE VEHICLES WILL BE MADE OF CIRCULAR PIECES OF PAPER · · ·
WAGON
BOTTOM
PROJECTION OF ROOF
MILK WAGON
DRAY
CONSTRUCTION OF TRUCKS FOR ALL WAGONS · FOLD ENDS OF LONG STRIP TO 'A' TO FIND FOLD 'B'
BRIDGE WITH THE APPROACH ·A·
A
CHICKEN COOP

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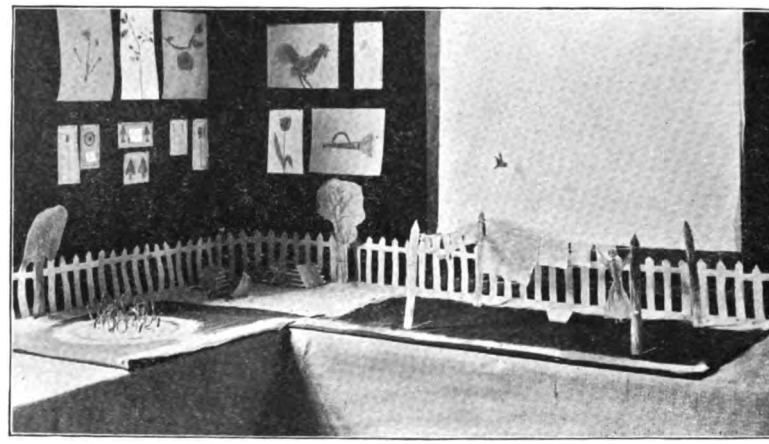
used, be the best possible for the locality. Local custom and local architecture may not be ignored, and the present drawings ought to be modified if necessary to make the objects characteristic.[1]

One caution should be given. Sand table work is fascinating and profitable only so long as the subject matter is changed from year to year, and new topics introduced at more or less regular intervals. If a



"THE MAID WAS IN THE GARDEN." SAND TABLE WORK. YEAR I. A STILL MORE ADVANCED FORM. HERE SOME THINGS, AS CHICKEN COOPS ARE IN THREE DIMENSIONS.

village street—the same street—be manufactured time after time the conception becomes crystalized and lacks vigor. Some new and interesting material must be worked over from time to time and another point of view considered.

This corollary point is also to be noted. As children pass from one grade to the next, becoming a bit older, and having more experience, their constructive work should also change to include the new outlook of the children. The village street will do very well about the second

[1]The Year Books of the Council of Supervisors of the Manual Arts, contains much material that is useful. See "Constructive work in the Primary Grades" by Miss Cremins. Book 1904. The outlines of the Director of Manual Training for New York City are full of suggestion.

The diagrams which accompany this paper are in scale as to measurement indicated, but the drawings themselves are made of the size most convenient for showing construction and for arrangement on the page. C. L. B.

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year in an average school, but the next year something must be added to it or a new phase considered, as a railway station with trains, cabs, etc., or an entirely new topic used. The work becomes more and more complex until about the fourth year. Then having about reached the limit of sand table construction another kind of hand work is employed and the second constructive period begun, dealing with the simple crafts and design.

The exercises for the street should be carried out in some heavy paper like tag or 50-lb. cover paper of suitable tone. Tag is a shiny buff in tone and does not take color (crayon or paint) well, but it is tough, folds easily, and is durable. The paper should be cut to size convenient for handling but not the exact size for use. Measurement is part of the study and as much as possible, the pupil should measure and cut his own pieces as they are needed.

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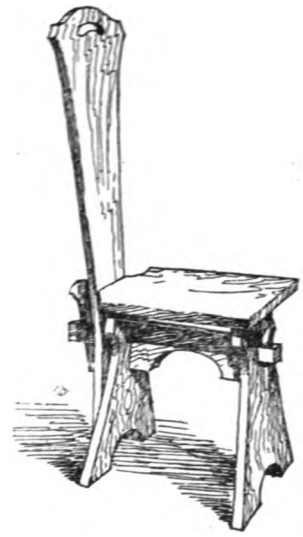

SIMPLE CHAIR MAKING

HENRY W. HETZEL.

THE amateur or student in woodworking, intent upon making furniture from his own designs, has always found the chair a somewhat difficult undertaking. The strength necessary to withstand racking at the joints, combined with lightness of weight, is not so hard to secure in the case of tables, benches, chests or desks. But with that most useful and necessary article, the chair, the case is different. No other piece of furniture in proportion to its size is so severely treated while in use. To meet these exacting demands most chairs are built of many pieces and fastened together with many joints,—too many for the novice to make use of without rendering the finished article either heavy and clumsy, or else too weak to be serviceable.

I have been for several years interested in this problem of simple chair construction and it has seemed to me that its solution lay in the substitution of one member for several glued up members. The back, for instance, might be made of one solid piece; and similarly, the front and back legs can be of two pieces altogether instead of the four used in the ordinary framed-up construction. It is not especially a new idea, to be sure, and chairs on this general principle have been built for centuries, but the method of connecting the parts has apparently not been sufficiently simplified to suit amateur ability.

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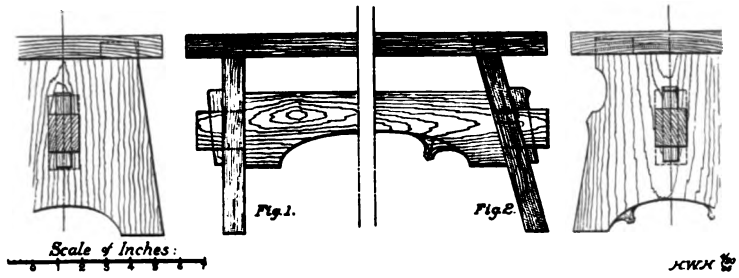
The loose-key method of construction has several advantages in connection with this class of furniture. It enables one to tighten up instantly members which have worked loose; a broken part may be replaced by a new one without injury to other parts, and the whole may be "knocked down" to take up less space in moving. But the greatest interest in this manner of joinery is perhaps a sentimental one. A chair or table thus constructed has an air of self-sufficiency that is appealing.



Without glue, nail or screw such an article suggests the ways of the primitive workman, who, finding but one material at hand, used it for fastenings as well as for the larger parts of the structure. Much of the popularity of the styles variously known as "arts and crafts," "mission" and others, it is well known, is due to this directness and sincerity in construction which these styles evidence or simulate. So far has the rage for the loose-key gone that manufacturers have sought to catch the public eye by using many keys, and big ones too; even putting them in where they have no earthly function.

Fig. 1 shows a simple all wood stool. The two boards forming the legs (which may be cut to a pattern of any suitable profile) are held together by a rail passing through a large mortise in each and held in place by a key through the projecting tenon. All this is old enough, but the method of fastening the seat is perhaps original. The legs extend by two tenons, dovetail-shaped, into corresponding mortises cut in the seat and the legs are sprung apart at the top into these dovetailed mortises when both keys are tightened.

Fig. 2 shows a modification of this stool in which the legs are inclined to the floor. The tenons at the top of the legs need not be specially formed dovetail-wise as the shoulders on the rail below can be so cut that the action of the wedges will spring the two legs *together*

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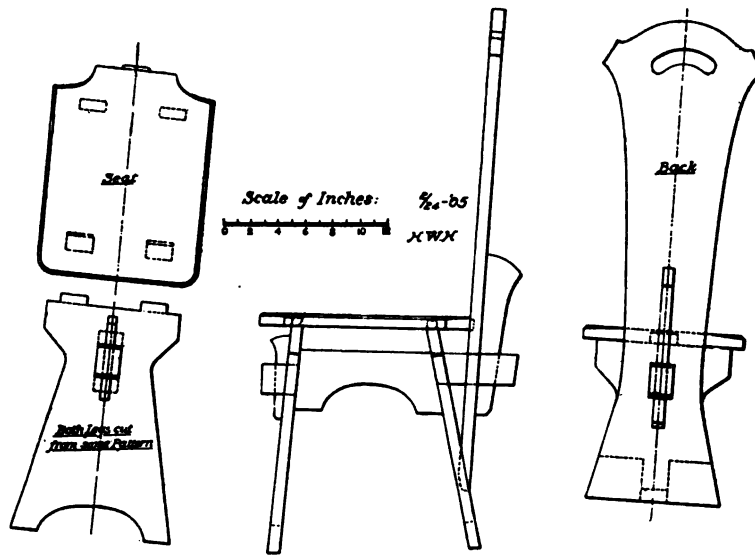
at the top and pinch the seat between them. In this and the previous stool one of the legs has a mortise somewhat larger than the tenon of the rail which pierces it. This enables the legs to rock sufficiently to allow the seat to be put in place or removed when only one key is loose.



From Fig. 2 to a design including a back—in other words, making a complete chair—may seem an easy step. We may imagine a longer tenon to one end of the rail and have it pierce the back as well as the leg, and have the same key tighten both. But the necessity of extending the back well down upon the rear leg for support has a tendency to turn the leg away from the shoulder on the rail when the key is tightened. This is contrary to the direction taken by the leg in Fig. 2, and consequently in our chair shown in the next illustration, no dovetails at the top of the rear leg are needed, the seat being prevented from lifting by a short tenon set into a shallow mortise in the back. The first effect of tightening the large key is to pinch the seat between the rear leg and the back of the chair; further tightening compels all three members rocking on the lower back shoulder of the rail, to ride forward against the front leg, where two tenons appropriately dovetailed secure the seat and prevent its rising. True, the student must form his joints with care and observe the proper distance between shoulders or he will find

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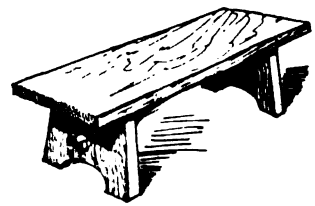
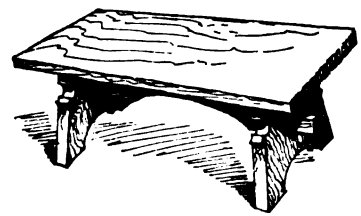
some disappointment in the way things tighten up—or fail to; yet, at Girard College in Philadelphia where a number of these chairs were made recently, boys of fourteen or fifteen years of age found none of these requirements to be too exacting.

To be sure, a chair thus engineered is not capable of the endless variations in design which a many-pieced, framed-up chair allows. Still, the proportion of the parts may be varied indefinitely and any number of profiles may be used for the four boards which mainly compose our simple chair. The seat may be made of a thicker board and hollowed out to make the "saddle seat" which many consider necessary to comfort. The angles which the seat and the back make with the floor are also matters of opinion, and the opportunity for carving is obvious. While it is next to impossible to make an armchair in this our screwless, glueless fashion, there is no law against upholstery. Yet I think that those who have made or used such a chair properly shaped have found smooth, hard boards sufficiently restful and waste no sighs for cushions.





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A HIGH SCHOOL EQUIPMENT FOR BENCH WORK, WOOD-TURNING AND MECHANICAL DRAWING

CHARLES H. BAILEY.

EQUIPMENTS for woodworking and mechanical drawing for the exclusive use of high school pupils will differ somewhat from those planned for the grammar grades.[1] It is possible to make the same equipment serve for both, and this is very commonly done, but in many places a separate equipment is provided for the high school. This is probably the more satisfactory way. The lists given here are suggested as being suitable for the ordinary high school, and represent about the minimum to which such equipments can be reduced and still remain satisfactory. Many high schools will install much more elaborate and costly equipments than these, but it is not such schools that most need suggestions, or which meet the most difficult problems in this connection. It is the school that has only a small amount of money to put into this work that presents the hardest problem, and it is there also that the teacher of little experience is most often found. It is for such schools that these tables have been formulated. They may also serve as the basis of a more extensive equipment and may be added to or modified to suit the special conditions.

Some of the items in the accompanying tables need a little explanation and discussion.

The question of the selection of a bench and vise for high school work is an important one. The bench and vise specified will prove quite satisfactory and may be had at a small cost, but one having some kind of rapid-acting, iron vise will be much better. The addition of two such vises will increase the cost of the bench by from seven to twelve dollars. Benches without drawers will probably give the best satisfaction. The bench is the basis of the equipment and a good substantial one sould be provided even if it is necessary to reduce the number of tools.

The tools should be first-class in every respect. It does not pay to furnish for this purpose tools of an inferior grade. Standard tools should always be specified.

[1]The first article of this series on equipments was published in the December, 1907, number.

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If power is available, it will be more convenient in every way to have a power grindstone in the bench room. This will cost about $26.00. In cases where the bench room and wood-turning room are in the same building and adjacently located, some of the equipment, such as the power grindstone and other power machinery may be used in common. In the equipment for wood-turning, the Reed lathe is specified as it is a high grade machine and a general favorite with manual-training teachers. There are other good machines, however, some of them materially lower in cost, that may be substituted without greatly reducing the efficiency of the department. The bench and equipment of tools specified here may be dispensed with if the bench room is conveniently located and available for use in the preparation of stock, otherwise it will be found to be almost a necessity.

The size of the motor required will depend upon the amount of additional machinery that is provided. For the number of machines given in the table, the 7½ H. P. motor will be large enough if a first-class machine is purchased.

The cost of shafting, hangers and belting will depend upon local conditions and therefore can be only approximated here. Well designed, self-oiling hangers should be provided.

If electric power is not available, a gas or gasoline engine will be the most satisfactory source of power.

For mechanical drawing in the high school, a regular equipment of tables and instruments should be provided. In the lists given here, it is assumed that every thing except pencils and thumb tacks is furnished by the school. The cost may be lessened somewhat by requiring the pupils to furnish paper, drawing boards, triangles, T-squares and scales.

All figures given are the regular trade prices and are very nearly correct. From five to ten percent may be deducted from these figures for large orders.

INDIVIDUAL TOOLS FOR WOODWORKING.

24 Single benches with two wooden vises, 4′ 6″ long	$192.00
24 Buck Bro's tanged firmer chisels, ½″	5.50
24 Buck Bro's tanged firmer chisels, 1″	7.20
24 Marking gauges So. 161	1.80
24 Disston back saws, 12″	26.00
24 Bailey iron jack planes, No. 5	36.00
24 Bailey iron block planes, No. 9½	14.40
24 Try-squares No. 12, 6″	4.50

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24	Rules, 24″, non-folding	1.70
24	Sloyd knives, riveted handles	6.50
24	Counter brushes, 9″	6.00
		$301.60

Bench hooks and mallets may be made by pupils.

GENERAL TOOLS FOR WOODWORKING.

6	Disston cross-cut saws, D8, 22″, 9 point	$ 7.00
6	Disston cross-cut saws, D8, 22″, 7 point	7.00
6	Stanley bevels, No. 25, 8″	1.20
6	Maydole Hammers, No. 12	3.00
6	Wing dividers, 8″	1.20
6	Buck Bro's tanged firmer chisels, ⅛″	1.10
6	Buck Bro's tanged firmer chisels, ¼″	1.20
6	Buck Bro's tanged outside gouges, 1″	2.50
6	Stanley cabinet scrapers, 3″ x 5″	1.10
6	Nail sets, assorted	.50
3	Spofford bit braces, 8″	2.40
6	Spoke shaves, Stanley No. 53	1.50
24	Hand screws, 8″	6.00
12	Champion Screw drivers, 5″	3.60
6	Small screw drivers	1.00
1	Stanley ratchet brace No. 921, 10″	1.50
3	Screw driver bits, assorted	.45
3	Rose Counter sinks, ⅝″	.45
2	Buck Bro's paring gouges, regular sweep, ¾″	1.20
1	Buck Bro's outside gouge, ½″	.65
1	Buck Bro's inside gouge, ½″	.65
1	Set Russell-Jennings auger bits	4.25
1	Set gimlet bits	1.00
1	Yankee drill No. 41	1.10
1	Clark's expansive bit, No. 2	1.00
1	Auger bit file	.15
6	Half round wood files, 10″	1.00
1	Framing square No. 100	1.00
1	New Langdon miter box No. 22 with saw	7.50
1	File card and scores	.20
1	Pliers and wire cutters, 6″	.25
1	Coes Monkey wrench, 10″	.65
1	L. & J. White drawing knife, 8″	.65
2	Turning saw frames, 14″	2.00
6	Turning saw blades, 14″ x ¼″	.60
3	Brass oilers, ½ pint	1.00
3	India oil stones, 6″ x 1⅝″ x ¾″	1.20
1	White's hand axe, No. 5	1.00

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1	Stanley plow set, No. 45	6.50
1	Grindstone in wooden frame, 24″ x 2″	4.50
1	Pair Colt's eccentric clamps to open 3-ft	2.10
1	Scraper steel	.20
1	Smooth mill file, 8″	.20
		$83.20

EQUIPMENT FOR DRAWING IN THE HIGH SCHOOL.

24	Adjustable Favorite tables	$192.00
24	Drawing boards, 19″ x 26″	15.60
24	T-squares, 26″	4.80
24	Triangles, 30 degree	4.80
24	Triangles, 45 degree	4.80
24	Sets instruments	120.00
24	Stools, 24″	18.00
6	Assorted irregular curves	1.50
1	Blue print frame, 18″ x 24″	8.00
1	Ream paper, No. 4 universal	12.00
1	Roll blue print paper	.60
1	Roll tracing cloth	7.60
1	Roll tracing paper	1.25
		$390.95

INDIVIDUAL TOOLS FOR WOOD-TURNING.

24	Reed lathes, 4-ft. bed	$1080.00
24	Buck Bro's chisels, ½″	8.40
24	Buck Bro's chisels, 1″	13.20
24	Buck Bro's parting tools, ⅛″ x ⅝″	12.00
24	Buck Bro's gouges, ¼″	9.60
24	Buck Bro's gouges, ½″	10.80
24	Buck Bro's gouges, 1″	16.80
24	Starrett's outside calipers, 6″	12.00
24	Wing dividers, 6″	3.60
24	Boxwood rules, 12″	1.70
24	Counter Brushes, 9″	6.00
		$1174.30

GENERAL TOOLS FOR WOOD-TURNING.

6	Round nose chisels, ⅜″	$ 2.40
6	Brass oil cans, ½ pint	1.44
3	Oil stones, 7″ x 2″ x 1″	2.75
3	Slip stones, assorted	.45

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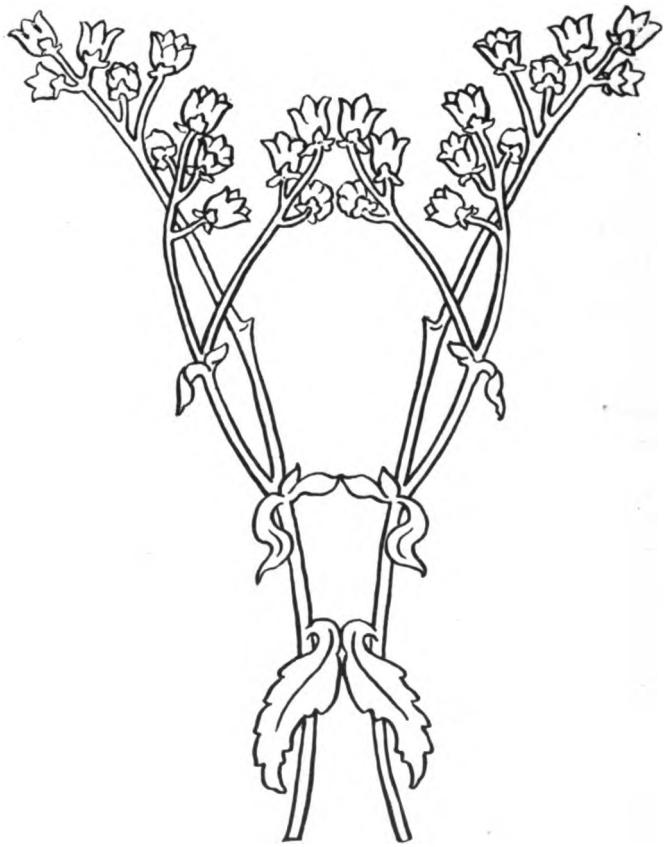
6	Starrett's inside calipers, 6″	3.00
1	Drill chuck with machine bits, ⅛″ to 1″ by 16ths	15.00
1	Mounted grindstone, 4″ x 30″, with truing device	26.00
1	Coe's monkey wrench, 10″	.65
6	Champion screw drivers, 6″	1.75
1	Single woodworking bench with tools	12.00
1	Combination saw bench, cross-cut and ripping	190.00
1	Electric motor, 7½ H. P	175.00
	Shafting, self-oiling hangers, belting, etc., about	125.00
		$555.44



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EDITORIAL

College Credits in the Manual Arts. We are glad to welcome the movement toward college credits in drawing and manual training because it means better organization of these subjects in the high schools and ultimately in the elementary schools also. We are especially encouraged to learn that several state organizations of teachers of the manual arts are now working in harmony with the larger sectional or national associations in a determined effort to define units of subject matter with reference to college credit. This is exactly what the manual arts teachers should do, and the more active they are in formulating these definitions the better it will be for the subjects they represent.

A few years ago it was feared that the universities would arbitrarily set standards in the manual arts, which would be detrimental to the high school work, but we believe that danger is now past (at least so far as the Central and Western states are concerned), and we know that several of the universities are not only encouraging the high school teachers to take the responsibility of standardizing their courses in the manual arts, but they are practically assuring them that the universities are ready to adopt whatever the high school teachers, after due deliberation, have agreed upon. This is well illustrated by the attitude of the university in one of our Northern states which has been expressed thus: "We are ready to give the credit as soon as you can agree upon courses for which credit should be given". The experiences of the past few years in standardizing other high school subjects with reference to university credit, has made it clear that co-operation rather than dictation is the policy of the college and university with reference to the high school. For this reason, the setting of standards in the manual arts, which nearly everybody recognizes as important in the immediate future, is more fully in the hands of the teachers of the manual arts than they seem to realize. It is therefore essential that such teachers—not merely the superintendents and principals of schools—get together on certain fundamentals of subject matter and formulate these in a manner satisfactory to themselves. When this has been done there is no reason for doubt that due credit will be given by the universities.

We see no reason why any teacher should stand aloof from this movement, but many why he should give to it his best efforts. The thorough study of subject matter values that is necessarily involved in

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making the needed definitions will result in the elimination of questionable elements from any teacher's course and the substitution of better ones; it is sure to stimulate enrichment in many directions. Moreover, such study helps in giving the teacher a more intelligent grasp of his subject—a grasp that too many teachers have not acquired in their hasty preparation to teach manual training.

But perhaps the most popular reason, though we think not the most important one is that university recognition would place drawing and manual training on the same level with other subjects. A unit course in manual training, for example, would then be counted just as valuable, educationally, as a unit course in Latin or mathematics. It is or is not, at the present time depending upon the enlightenment or openmindedness of the principal of the school, and upon the ability of the teacher of the manual arts in organizing courses and maintaining a high standard in the work. If all principals were openminded and all courses were well organized and all teachers were skillful, we would not have to worry about the place of our subject in the curriculum, but with conditions as they are, we know of nothing that will tend to reform principals, courses, and teachers alike in greater degree or in less time than the pushing forward of the movement for college entrance credit in the manual arts.—B.

Industrial Education in Cleveland. The general interest in the great problem of industrial education is particularly manifest in Cleveland. The Board of Education, the Chamber of Commerce, the labor organizations, the Builders Exchange and other employers' associations and the Y. M. C. A. are all in sympathy with the movement and are all bending their efforts in practical measures now in operation or in contemplation, to bring about the solution of the problem.

The new Technical High School now in process of construction, is primarily the work of the Board of Education, but in the perfecting of plans and the arrangement of courses of study, which will emphasize more strongly than has perhaps been done in any other secondary school in this country the industrial side of education, conferences have been held with the Chamber of Commerce, with employers' associations and with the Council of labor organizations.

With the beginning of the new year an evening trade school for machinists was opened in the manual training department at Central High School. This evening school was established by the Board of Education in response to an appeal from the labor organization, and will doubtless be the nucleus of public evening trade schools in other industries as they are demanded.

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Within the trades unions there is a well defined movement toward industrial education. The union pattern makers are conducting a school in the interests of their apprentice organization, providing instruction in the reading of drawings, the different phases of pattern production and in the use of tools. The bricklayers' union has well developed plans for a school for its organized apprentices to include instruction in the theory of their trade, in the study of plans and applied mathematics. The sheet-metal workers are planning a similar school. Some of the unions of the building trades have arranged courses of talks and discussions for their members upon subjects related to their work, by architects and men of broad experience in their trades.

In addition to its many educational classes in theoretical work, the Y. M. C. A. has planned, and has partly in operation, a school of industrial education providing facilities for men employed in the metal-working trades, in electrical industries, and in charge of steam plants. The plan is to offer practical instruction in various lines of machine shop work, in electricity with its various commercial applications, giving an opportunity to specialize in different lines, and in steam engineering to those who desire to become licensed engineers. In connection with the shop practice, there will be practical instruction in drawing, shop mathematics and mechanics. Most of the courses are given in the evening and the thought is to make them, so far as possible, supplemental to apprentice systems.

The problem of industrial training below the secondary school is demanding the attention of the school authorities, and the results of some experiments in this direction are looked forward to with interest.

—R.

The newspapers have recently announced a gift by David Ranken, Jr., of a million dollars for the establishment of a school of mechanical trades in the city of St. Louis. This is a noble and timely gift, and we hope it will not be diverted to establish another college of engineering or university. Too many endowments have already hit wide of the mark. This one should be kept sacred for the original purpose of its donor, and so be a pioneer in working out the great problem of vocational training for the industries, which is immediately before us. As St. Louis furnished us the first manual training high school, let her also furnish us the correct model for a trade school.

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ASSOCIATIONS

WILLIAM T. BAWDEN, Editor.

FOURTH ANNUAL HIGH SCHOOL CONFERENCE, UNIVERSITY OF ILLINOIS.

The fourth annual High School Conference was held at the University of Illinois, Urbana, November 21, 22, and 23, 1907, and proved to be a very successful and profitable meeting. According to statement in the published program this series of conferences "is undertaking a discussion of all the subjects now included in the high school program with a view to formulating courses or syllabi for each subject or group of a rather definite nature as a basis for standardizing the high school work of the state. At the same time a parallel discussion of the program as a whole is being carried forward with a view to securing the best adjustment now feasible of the various courses which may properly be included in the program."

The conference included three general sessions besides the meetings of six sections. The principal address was that on Friday evening by Dean A. Ross Hill, Cornell University, on needed readjustments in the high school program of studies. The six sections were: English, social science, mathematics, geography, agriculture and domestic science, and the manual arts.

There were two sessions of the manual arts section, Friday morning and afternoon. The Committee on Manual Arts which had been appointed the previous year, consisting of Charles A. Bennett, Chairman, George W. Eggers, C. C. French, J. H. Gill, and F. U. White, presented a report in the form of outlines for one-year courses in each of the following subjects: woodworking, metalworking, mechanical drawing, and freehand drawing. Copies of these outlines, as well as an additional one on "suggestive treatment of problems," had been prepared and were distributed at the meeting.

The chairman of the section, Professor E. J. Lake, University of Illinois, introduced Charles A. Bennett who presented the report of the committee. The purpose of the committee was not to prepare a fixed course of study, but to present something that would be suggestive and that would assist in leading to some standard of attainment. It was proposed that two years be spent in covering the four one-year courses, as follows:

1st Year. Woodworking, 5 hours per week,
Freehand Drawing, 2 hours,
Mechanical Drawing, 3 hours.

2nd Year. Metalworking, 5 hours per week,
Freehand Drawing, 3 hours,
Mechanical Drawing, 2 hours.

Two types of work in the manual arts in the high school were distinguished: (1) That which is given from the standpoint of general education; and (2) That which is intended as technical education. That is, there are courses

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that it is desirable to have every boy take whether he is to continue his education at the engineering school or the divinity school or to leave school; and, on the other hand, there are technical courses, such as pattern-making, which are more distinctively industrial in character than most of our manual arts work. The former may be considered appropriate subjects for *entrance credit*, the latter for *advanced credit*.

The discussion at the morning session was opened by Principal F. D. Thompson, Galesburg High School, who advocated making a start even if it be but a small one. Let the work develop gradually; if you demonstrate that it is a good thing you can get the appropriations as you need them. It is much better so with the community back of it than to "swallow it whole" and have continual grumbling over the expense.

In response to a question the chairman of the committee differentiated three general methods of handling a course in woodworking: (1) The pupil is shown a copy of the object to be made, from which he makes a freehand sketch, then the working drawing, then the object at the bench. One difficulty is that the steps in procedure in drawing are not parallel to those in woodworking; you cannot give the best course in drawing and the best course in woodworking parallel. This method we may call the *school* method. (2) The pupil is given a drawing of an object he has never seen or at least observed closely, so that he is required to *read* the drawing, and he then produces the object. This may be called the *artisan* method. (3) Given a need, e. g., a sled. The pupil makes a sketch of what he wants to make, which he gradually develops into a careful working drawing in which he has, in some sense at least, done some creating. He then makes the object in the shop, retaining the right to change it at any point until it serves its purpose and is finished. This may be called the *craftsman* method.

The discussion was participated in quite freely and was at times animated. The needed spice to flavor the whole was furnished by a lively tilt between two manual training men present who maintained opposite opinions in a controversy about the relative merits of the "joint" or "exercise" and the "useful model." One speaker thought that some of the statements that had been made concerning the high degree of interest on the part of the pupils in "models" as contrasted with "exercises" were unwarranted and misleading. He said, in substance: "If the pupil's thought is on a finished article, as a taboret or box, it is not on the planing. What I want is thought concentrated upon the thing that is being done and not upon some future application of it. A boy can plane down a piece of wood to within one-sixty-fourth of an inch and be looking at the rafters all the time. The piece might then be good enough for the taboret but not for what I call scientific use of the tool. I want him to get the other sixty-fourth of an inch —I want him to get it exactly right." The other speaker, who had been advocating the taboret, asked: "How do you get that sixty-fourth of an inch?" The question was parried, and the second speaker rejoined: "You get that sixty-fourth of an inch because you stand over the boy and make him do it; I get it because the boy wants it."

The attendance at the afternoon session was nearly as large as in the morning, about fifty supervisors, principals, and superintendents being present. The

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discussion was centered particularly upon the art side of the work and was opened by George W. Eggers, Chicago Normal School; topic: "Design in its relation to industry and the manual arts in the school." Art does not necessarily mean decoration. The very simplicity of some objects is their claim to beauty. In the making of an object the first demand is upon construction, that it *be* strong and suited to its purpose; the first demand upon art in the making of an object is that it shall *look* strong.

The problem of the whisk-broom holder is regarded by many as an opportunity for decoration. We frequently see the design breaking out all over it, like a rash. But the presence of decoration implies value—the art put into a thing should bear some relation to the value of the thing.

It is better to teach your pupils to appreciate the art in the things and constructions about them than to talk to them about the "old masters."

The discussion at this session took the direction of attempting to gather up some definite and tangible results from the conference. It was decided unanimously, upon motion, to recommend to the University authorities the adoption of these courses of study as prepared by the committee as a basis for work to be accepted for entrance credit, it being understood that one year's work in a laboratory subject means a minimum of 120 hours of 60 minutes each and represents one-half unit of credit.

It was also decided, upon motion, to recommend that the Manual Arts Section be continued for another year, at least, and that members be requested to report next year the results of their experiments with these courses.

The committee made it clear that the courses of study offered were not intended to be rigidly adhered to, but that they are to be considered as suggestive merely not only in problems but in the order of processes.

The outline of the course in woodworking was printed in the December number of the Magazine, and it is hoped to find room for the others later.

—W. T. B.

NATIONAL EDUCATION ASSOCIATION.

The Executive Committee has definitely announced the selection of Cleveland, Ohio, for the Forty-sixth Annual Convention, June 29 to July 3, 1908.

It was a source of regret to the members that it was not possible to hold the fiftieth anniversary of the organization of the association in Philadelphia. The Cleveland convention, however, will be the fiftieth anniversary of the first regular convention of the Association, which was held in Cincinnati, Ohio, August 11-13, 1858. It is appropriate that the fiftieth anniversary of the first convention be held in the state of Ohio; a state which has been one of the most loyal and helpful to the interests of the Association during all those years; which ranks third among all the states in the total number of memberships for fifty years; and third also in the present number of active members enrolled although it has had the advantages of but one convention since 1858, viz., at Cleveland in 1870. Since Cleveland is near the geographical center of the active membership, a large attendance is expected.

The Department of Superintendence will hold its next annual meeting in

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Washington, D. C., February 25-27, 1908. Special interest centers in a symposium on "The Place of Industries in Public Education" at the Tuesday afternoon session. At this time the following propositions are to be discussed:

(1) The ideals of a democracy require a system of public education that shall provide equal educational opportunities for all; Dean James E. Russell, Teachers College, N. Y.

(2) Equality of opportunity can be secured only by proper recognition of (a) individual differences in native capacities and in social environment, (b) the requirements of vocational efficiency as well as of (c) general intelligence and executive power; Professor Edward C. Elliott, University of Wisconsin.

(3) The most urgent need of our educational system is an adequate provision for the vocational needs of children destined for industrial and domestic pursuits; Pres. James F. Mc Elroy, Consolidated Car Heating Co., Albany, N. Y.

(4) A comprehensive program of industrial education requires:

(a) Constructive activities as an essential and important factor in the elementary school course; Miss E. E. Langley, School of Education, Chicago.

(b) Intermediate industrial schools, admitting children at the sixth school year and equipping them for specific industrial pursuits; Charles H. Morse, Secretary Massachusetts Commission on Industrial Education.

(c) Technical high schools for the training of industrial leaders; George H. Martin, Secretary Massachusetts State Board of Education.

The general discussion is to be opened by Jesse D. Burks, Principal of Teachers' Training School, Albany, N. Y.; Arthur H. Chamberlain, Acting President, Throop Polytechnic Institute, Pasadena, Cal.; Carlton Gibson, Superintendent of Schools, Columbus, Ga.

Other societies meeting with the Department of Superintendence are: National Society for the Scientific Study of Education; Society of College Teachers of Education; Educational Press Association of America; National Committee on Agricultural Education. On Thursday there will be organized the new "Department of Rural and Agricultural Education."

Headquarters of the Department of Superintendence will be at the New Willard Hotel. For copies of the preliminary bulletin containing announcement of hotel arrangements, etc., or for complete program to be issued about February 1st, address Irwin Shepard, Secretary, Winona, Minn.

OHIO ART AND MANUAL TRAINING TEACHERS' ASSOCIATION.

The Ohio Art and Manual Training Teachers' Association met in Columbus on Dec. 26 and 27, 1907, as one of the Allied Educational Associations of Ohio. President Thos. K. Lewis, Asst. Professor of Engineering Drawing in the State University was in the chair.

On Thursday morning, Prof. Thos. E. French read a paper on "Mechanical Drawing and Lettering for Public Schools." He discussed the subject from the standpoint of the college professor. He said that students enter the college with all degrees of preparation in mechanical drawing. The manual training high schools usually do pretty good work in this subject. He emphasized the importance of a thorough mastery of a few subjects in drawing in the secondary school

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rather than attempting to cover the whole field in a desultory manner. A good, rapidly-made freehand letter is much to be preferred to a labored instrument-made one.

H. W. Lowell, director of manual training in the Columbus, Ohio, schools, talked on the work being done in the schools over which he has supervision. The opening of the present school year marked the introduction of manual training, domestic science and industrial arts in the public schools of Columbus. Everything has started off under the most favorable conditions, with fourteen thoroughly equipped centers for the seventh and eighth grades and industrial arts for the lower grades. Mr. Lowell has five assistants. Soon the work will be advanced into the several high schools. An industrial high school is a possibility of the near future.

Reports showed that in the following schools instruction in manual training was begun this fall or an enlargement of the work had been made: Piqua, Akron, Youngstown, Mt. Vernon, Troy and Toledo. At Newark, Ohio, under the direction of W. E. Painter, a gradual development has been made during the last five years. Woodwork for the boys and hand-tooled leather for the girls are now carried on in the seventh and eighth grades and high school. Mr. Painter has been untiring in his efforts to build up a strong department in manual training in his city and results show that he has been successful. While the work is optional with the pupils and they pay for all material used, fully one-half of those in the grades to which the work is offered elect it. Each pupil has a period of two hours per week.

Prof. F. E. Sanborn in a carefully prepared paper discussed some phases of the general manual training movement in the United States. He presented reasons for including the manual arts in the curriculum of the schools from the first grade through the high school. The kinds of materials to use in construction work and the grades in which each is usually used were discussed by the speaker. Prof. Sanborn urged the importance of the manual arts being included in the education of every boy and girl. At the conclusion of his paper he read a bill to be brought before the State Legislature at its session this winter. This bill had been prepared by Prof. Sanborn, as the Legislative Committee of the Ohio Art and Manual Training Teachers' Association, for the purpose of making compulsory the teaching of drawing and manual training in the public schools of Ohio. The bill also provides for the compulsory examination of teachers in drawing.

By an amendment to its constitution the Association extended its membership to include domestic science and domestic art teachers. All teachers of these subjects are invited and urged to join the Association. This may be done by sending the annual membership fee of fifty cents to the Secretary-Treasurer.

The Association voted to meet next November with the Central Ohio Teachers' Association.

The subject of college entrance credits in drawing and manual training was discussed. Definite action in the matter was deferred until later. In the meantime a committee was appointed to report at the next meeting on the present status of the subject in the United States.

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The following officers were elected for the next year:

President, Fred C. Whitcomb, Miami University, Oxford; vice-president, Nellie Petticrew, Piqua; secretary-treasurer, Grace C. Sylla, Akron. Executive committee, H. W. Lowell, Columbus, chairman; Florence E. Ellis, Cleveland; and the officers, ex-officio. —FRED C. WHITCOMB.

TEXAS SOCIETY OF MANUAL TRAINING TEACHERS.

The Texas Society of Manual Training Teachers met at Houston on the 27th of December. A round table was conducted by E. M. Wyatt, director of manual training at Houston. Many interesting discussions were heard on subjects relating to the teaching of manual training.

In the afternoon the annual business session was held, and the following special work was undertaken for the year, committees being appointed to carry it on: (1) to work through local representatives in State Legislature for favorable legislation on manual training and for state appropriations for maual training; (2) to take up the question of credits in manual training work with the State University; (3) to assist in every way possible the schools in Texas that have manual training courses but, on account of lack of funds or good teachers, or for any other reason, the results of the instruction in manual training have not been satisfactory; (4) to render all possible assistance to any schools contemplating the introduction of courses in manual training.

The following officers were elected for the year: President, E. M. Wyatt, director of manual training, Houston; first vice president, Cree T. Work, president of Texas College of Industrial Arts, Denton; second vice president, Adolph Uhr, director of manual training, San Antonio; third vice president, Laura Neale, director of domestic science, Ft. Worth; secretary-treasurer, Arthur B. Mays, assistant director of manual training, Dallas.

The Annual Dinner of the Boston Manual Training Club was held at Brigham's Hotel on the evening of December 7th. The Club is making rapid strides in membership and about forty members were present. The dinner was preceded by a paper on tooled leather, by Frederick W. Ried, of Leominster, and was followed by a social hour which centered about a very clever slight-of-hand performance.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

Plans are well under way for the fifteenth annual meeting which is to be held in Indianapolis April 8 to 11. Everything now indicates that this meeting will be one of the greatest in the history of the organzation. Certainly the local committee is doing its part to make such a meeting possible. The Shortridge High School will have its Easter vacation during that week so as to allow the Association to use its ample buildings. The other schools, however, including the Manual Training High School, will be in session so that members of the Asso-

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ciation will be able to visit the schools. This will give an exceptional opportunity. The new Shortridge building is large enough for the sessions of the Association and the exhibits. Indeed it is expected that there will be sufficient wall space to hang all the exhibits without putting up the usual unsightly frames, the exhibits being hung from the picture moulding or placed in cases. Details concerning the exhibit can be found in the Official Bulletin for December, which may be obtained by applying to the secretary, R. A. Kissack, Yeatman High School, St. Louis, Mo.

It is definitely announced that the next annual meeting of the Eastern Manual Training Association will be held in Washington, D. C., April 13-15, 1908.

Judging from the program of the seventh annual meeting of the Northeastern Minnesota Teachers' Association held at Duluth Nov. 15 and 16, manual training is a live topic in Minnesota. At the general sessions were the following addresses: "Industrial Education", by Supt. L. D. Harvey of Menomonie, Wis.; "Industrial Education and Social Betterment", by Dr. Fletcher H. Swift of the University of Minnesota; "Preparation of Teachers for Industrial Education", by President E. W. Bohannon of the Duluth Normal School; "Problems Met in Adapting Manual Training to Grades and High School", by George M. Brace, supervisor of manual training in Duluth; and "Problems Met in Adapting Domestic Science to Public School Work", by Miss Pettingill of the Duluth Normal School. Then there was a joint meeting of the high school and manual arts sections, with a manual training program of four addresses.

The First Annual Convention of the National Society for the Promotion of Industrial Education occurred in Chicago, January 23-25, 1908. Report of the proceedings of this meeting will appear in the next issue.

Several very interesting programs showing the work outlined for the school year of 1907-08 by associations of teachers have been sent to the Editor.

The Principal's Meetings of the Minneapolis, Minn., Public Schools are held on the first Tuesday of each month from October to May. Each meeting lasts one hour and there is an understanding as to how the time is to be divided. The reader of the principal paper is allowed twenty minutes and the member who opens the discussion is allowed ten minutes, leaving thirty minutes for general discussion. It is expected that the leading paper will be placed in the hands of the one who is to open the discussion at least one week before the date assigned for the topic.

Two of the meetings are to deal with the topic: Educational Values in the Elementary Grades. (a) The Informational, Disciplinary, and Cultural Studies: Reading, Arithmetic, History, Geography, Music, etc. (b) The Essentially

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Motor Activities of the School: Drawing, Manual Training, Industrial Work, Domestic Science. The Second half of the topic is assigned for the meeting April 7th, and will be presented in a paper by Miss Gowdy. The discussion will be opened by Mrs. Rollins.

The Manual Arts Association of Allegheny County, Pa., holds its meetings on the third Friday of each month from October to May at the Fifth Avenue High School, Pittsburg. This is the third year of the Association and its members number seventy. It is a branch of the Eastern Manual Training Association, and its membership fee is two dollars, one-half of which goes to the local and one-half to the parent organization. The president is Clifford B. Connelley, Carnegie Technical Schools, and the secretary, Miss Alice Henry, 5325 Wilkins Avenue, Pittsburg.

The Year Book is a neat little booklet of fourteen pages in which may be found, besides the year's program, a list of the officers and committees, names and addresses of members, and the Constitution and By-Laws.

One meeting is devoted to each of the following general subjects: Exhibits, Kindergarten, Primary Manual Training, Design, Domestic Science, Domestic Art, Mechanical Drawing and Shopwork. Each general topic is divided into several sub-topics so that in all twenty-eight names appear in assignments to program duty.

The Teacher's Art Club of Pittsburg, Pa., organized in 1902, regularly holds its meetings at the Fifth Avenue High School on the last Monday of each month from September to May, with additional open or social meetings at the call of the Executive Committee. The President is Mrs. M. E. VanWagonen, and the secretary, Miss Agnes E. Lawton, 460 Swissvale Ave., Wilkinsburg, Pa.

The general topics assigned are: Applied Design, A Lesson in Pottery, Illustrated Christmas Stories, Paper Work, Picture Study, Practical Demonstration of Color, Mechanical Drawing and Construction work. One of the meetings is to take the form of a visit to the studio of August Zeller, the sculptor of Carnegie Institute.

One unique feature of the organization of the work of this Club is the assignment of one member to each meeting to answer questions upon the topic that is to be discussed at that meeting. Page six of the Year Book contains a list of these assignments accompanied by the announcement: "Members of the Club will endeavor to answer all questions pertaining to the lecture of the day, if presented in writing two weeks previous to the meeting."

The Year Book contains the list of officers and committees, the program for the year, the Constitution and By-Laws, and the names and addresses of forty-two members.

The two Year Books referred to in the foregoing paragraphs are excellent examples of their kind. They will well repay examination by those who contemplate the organization of local associations of teachers.

The New Jersey State Teachers' Association met at Atlantic City December 26-28. A number of strong addresses were provided by the program committee:

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Vocational Education, by Paul H. Hanus; Education for Institutional Life, by W. E. Chancellor, Washington; A Typical Industry as a Basis for Grammar Grade Manual Arts, by Cheshire L. Boone, Mont Claire; The Industrial Education Movement and the Elementary School, by Henry Turner Bailey.

The December number of the *Manual Training Teacher* contains the program of the lectures for the year 1908 by the London, England, branch of the National Association of Manual Training Teachers. The meetings are held on the third Saturday of each month from January to December in the lecture hall of the College of Preceptors.

Two of the lectures are to be illustrated with stereopticon slides: Timber, and Joinery. Other topics are: Psychological Basis of Manual Training, The Manual Training Teacher—A Specialist on the School Staff, Ethics of Manual Training, Place of Manual Training in the School Curriculum, Artistic Handicraft in relation to Manual Training, Schemes of Manual Training—Their Use and Abuse. One of the meetings will be a visit to Kew Gardens for the study of trees.

The Round Table of Supervisors of Drawing of Western Ohio met at Dayton, November 29, 1907. The following program was presented:

"Art at the N. E. A.," Mary A. Woodmansee, Dayton. "Handwork in the Primary Grades," Lillian Bicknell, Columbus. "Drawing in the Primary Grades," Clara Velmyr Cosley, Coshocton. "Working Drawings in the seventh and Eighth Grades," Ella R. Bartholomew, Springfield. "The Teaching of Art in the High School," Mary Kyle, Troy. "Drawing and Construction Work for the Month of December," Alice Robinson, Miami University, Oxford. These and other subjects were also discussed in an informal way by all members present.

The following officers were elected for the next year:

President, Ella R. Bartholomew, Springfield; secretary-treasurer, Anna Bier, Greenville.

The second annual meeting of the Teaching Section of the Lake Placid Conference on Home Economics was held at Emmons Blaine Hall, the University of Chicago, December 31, 1907. Miss Helen Kinne of Teachers College, New York, the chairman of the section, presided.

The Executive Committee of the Illinois Manual Arts Association considers itself fortunate in being able to announce for the principal address after the Banquet at the Friday evening session, "Some Phases of Our Educational Problems with Reference to the Manual Arts," by Mrs. Ella Flagg Young, principal of the Chicago Normal School.

The Association holds three sessions, Friday afternoon and evening and Saturday morning, February 7 and 8, at Bradley Polytechnic Institute, Peoria, Illinois. Copies of the complete program may be had upon application to the secretary, William T. Bawden, State Normal University, Normal, Illinois.

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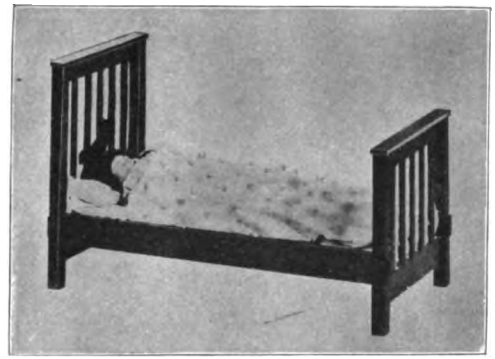

SHOP PROBLEMS

GEORGE A. SEATON, Editor.

DOLL'S BED.

The doll's bed shown this month was submitted by Ira S. Griffith of Oak Park, Illinois, and is suggestive of the possibilities along the line of doll furniture in general. Mr. Griffith suggests that by multiplying the measurements given by three a very satisfactory child's bed can be made. The side rails are to be fastened with wooden pins thus allowing the bed to be taken apart as a larger bed and packed. The construction calls for no comment except where students are accustomed to make the mortise by first boring holes. This is impossible in this case as the mortises are too narrow. A chisel just the width of the mortise should be used.

The bed shown in the photograph had a particularly satisfactory finish. It was obtained by staining the wood with Breinig's brown Flemish water stain diluted with an equal volume of water, then filling with Wheeler's No. 5 paste filler, and finally covering with a very thin coat of shellac. Care should be taken to have the shellac so thin that it will not gloss the wood.

PLUMB BOB.

This problem devised by W. F. Raymond of Bradley Polytechnic Institute has proven most satisfactory for second year high school boys just beginning hand-tool turning in metals. The steps in the process of making the plumb bob are as follows: (1) Select a piece of machinery steel $3\frac{9}{16}$ in. long and $\frac{7}{8}$ in. in diameter; (2) Center the piece and square it up to $3\frac{1}{2}$ in. in length; (3) Turn to $\frac{3}{4}$ in. in diameter; (4) Turn the taper of the point making the piece $3\frac{1}{4}$ in. over all; (5) Drill the hole in the top end; (6) Counterbore and tap this hole; (7) Turn the cap to the required form and size; (8) Thread and knurl the cap; (9) Drill the larger hole, $\frac{1}{8}$ in., nearly through the cap from below; (10) Screw the cap into the lower part and polish ready for hardening; then cut off the screw cap, finish, and drill the $\frac{1}{16}$ in. hole in the cap; (11) Case-harden the lower part, and polish again.

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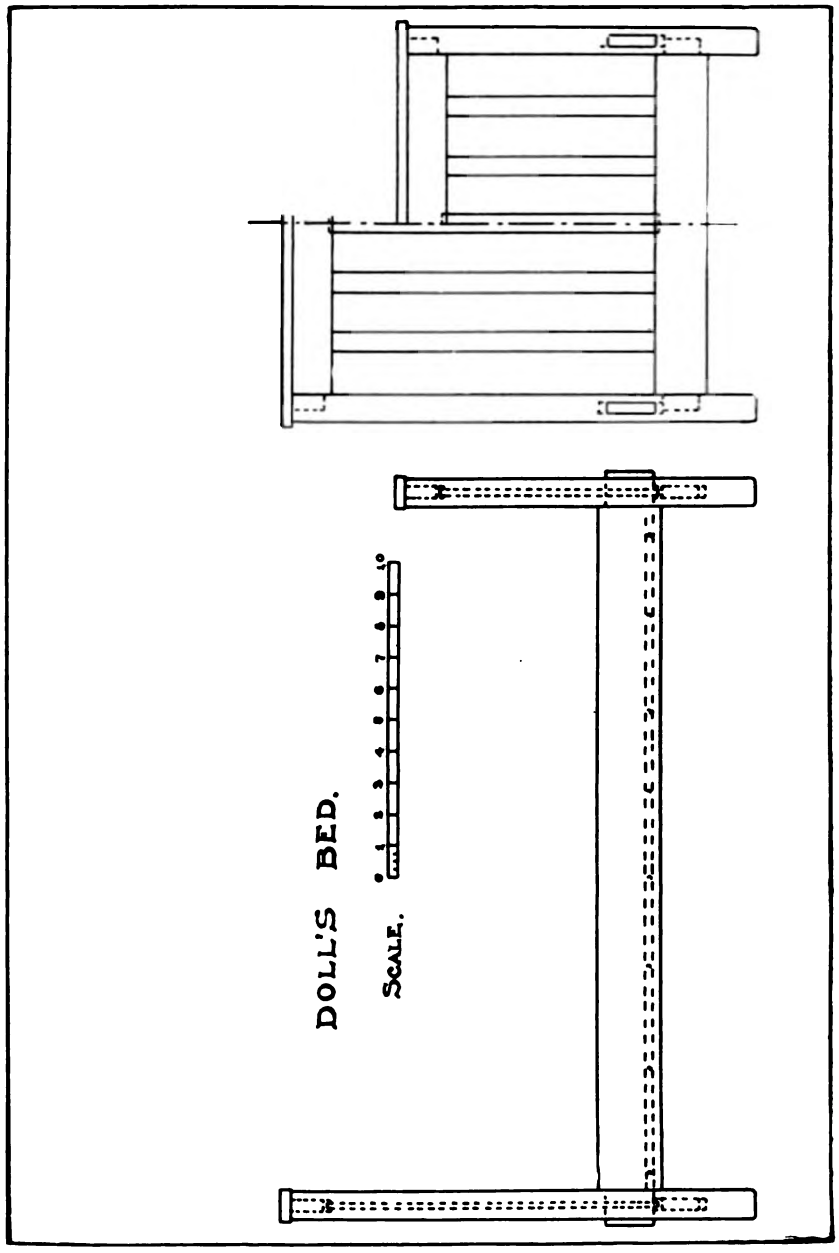

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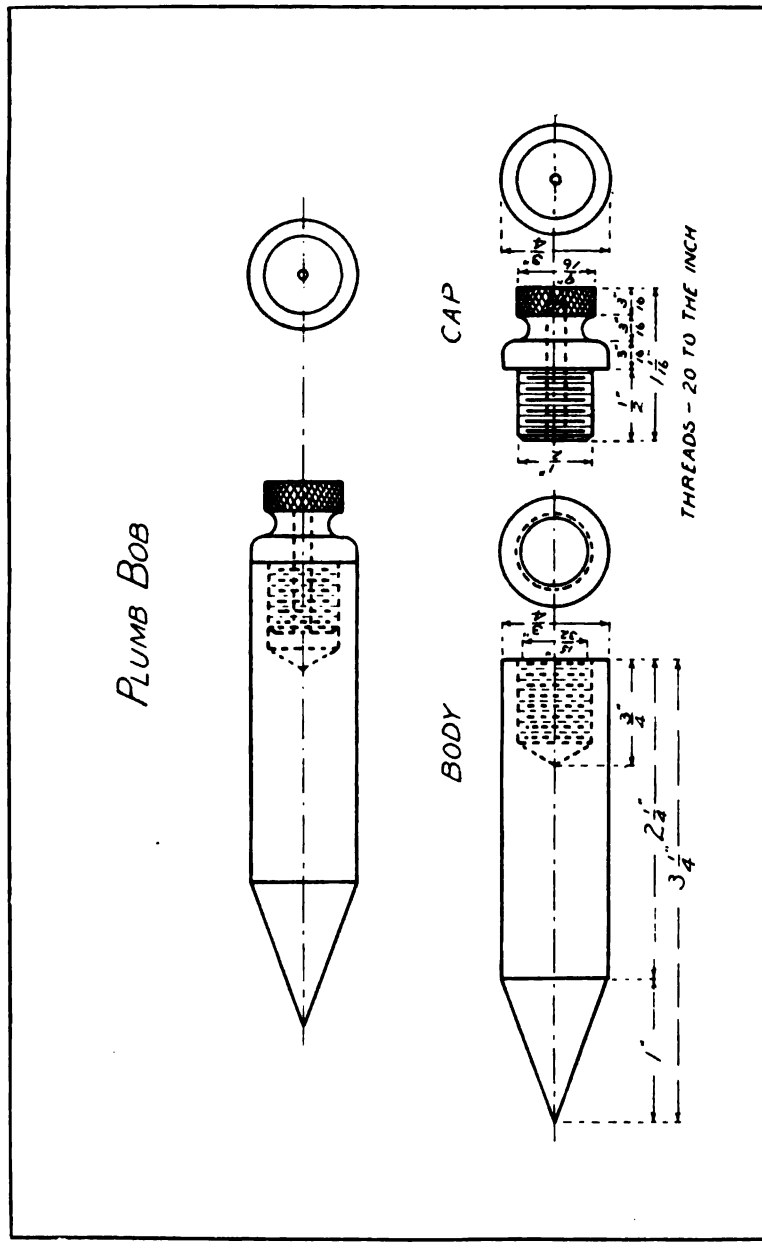

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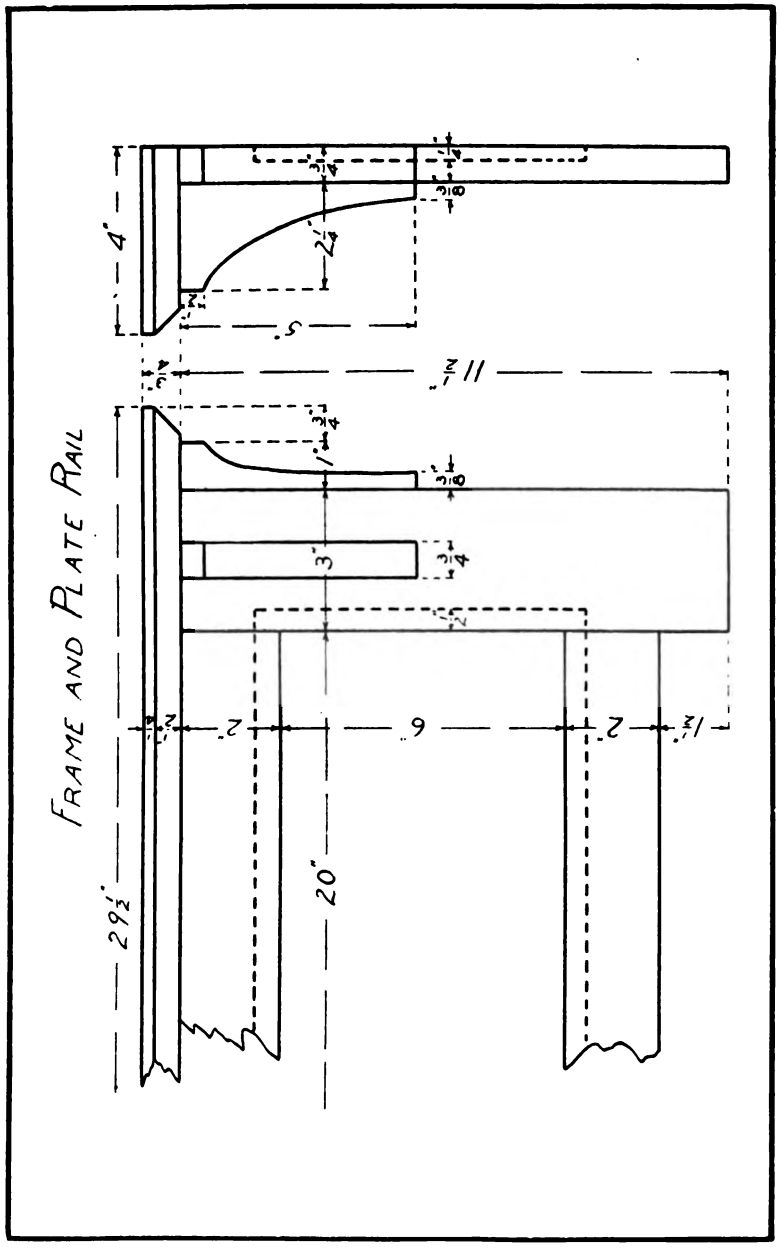

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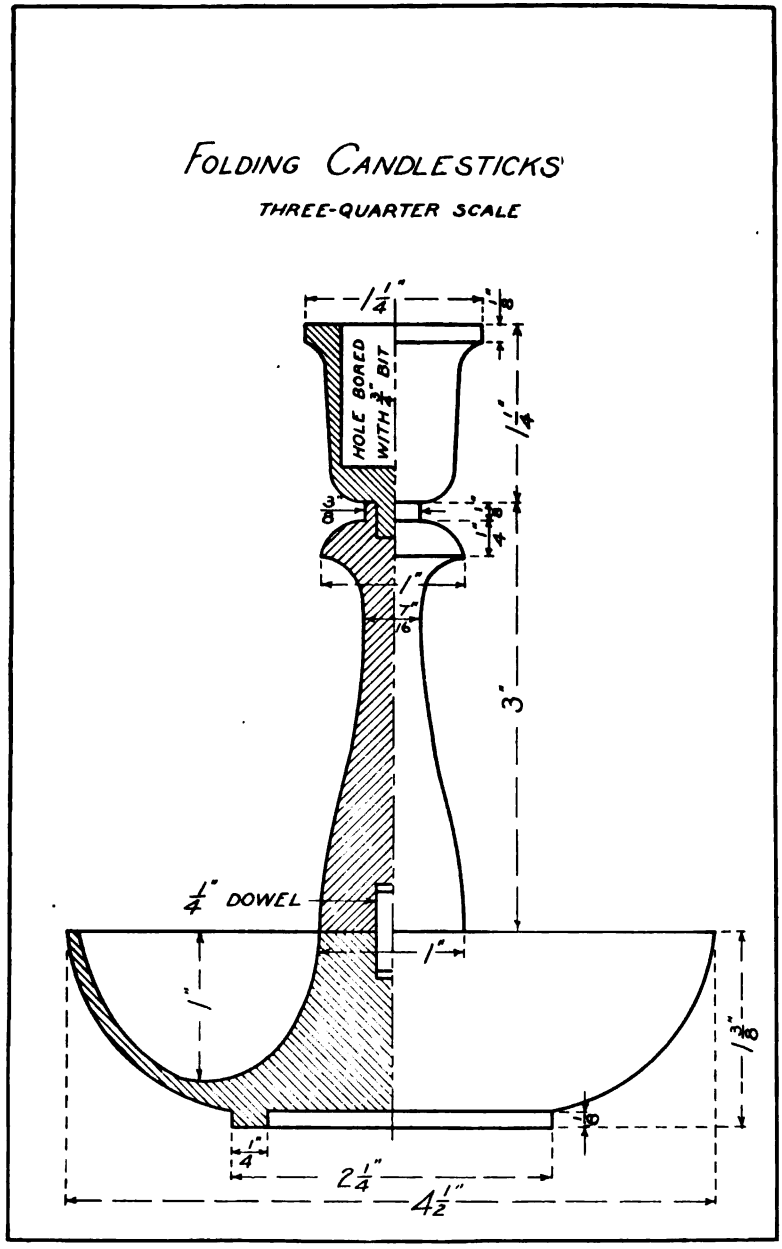

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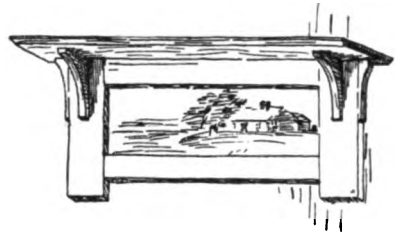
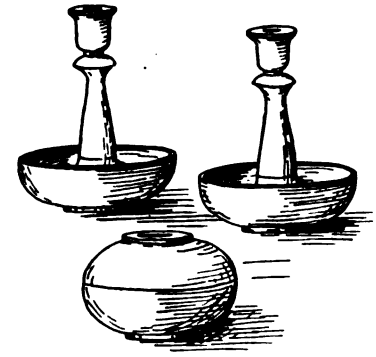
FRAME AND PLATE RAIL.

Among the exhibits of interest at the last manual training convention was the combined frame and plate rail shown from the Cleveland schools. The construction is comparatively simple for a design so pleasing. As shown in the working drawing no particular type of joint is indicated. This can best be adapted to the abilities of the students undertaking the work. The top shelf is generally made with three narrow grooves for supporting plates, though the model looks very well where serving simply for a picture frame.



FOLDING CANDLESTICKS.

The idea for the folding candlesticks shown was taken from a pair brought back from Japan. They furnish an interesting problem in turning and when carefully made the two candlesticks will pack together in the base portions and allow very little motion. To join the stem to the base, quarter inch dowels are used, in one candlestick the dowel being glued into the base while in the other candlestick it is glued into the stem. In this way when the candlesticks are packed together the dowel which is glued in one base will fit into the hole left in the other base, thus joining them together. A dowel may also be used to join the candle holder to the stem, or more simply a quarter-inch projection may be turned up as a part of the candle holder.



NOTES.

Whenever sandpaper is used on a flat surface some sort of block is needed around which to wrap the paper. This is generally a piece of scrap to which little thought has been given. If a little care be taken with this, a block quite worth preserving may be made. As shown in the illustration, grooves ¼ in. wide and ¼ in. deep are made down the sides into which loose fitting strips can be slipped. When the sandpaper is in place the strips will be held tightly in position. As the paper wears out it can be removed and new substituted. If the block is made of ⅞ in. stock 2¼ in. wide and 4 in. long, it will be just about the right size for one-sixth of a sheet of sandpaper. All the parts may be easily ripped out on a circular saw or the students may be allowed to make the blocks for themselves.

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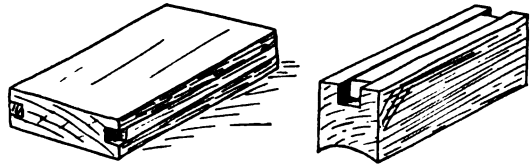
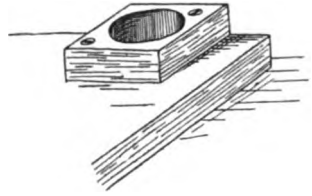
The same idea may be utilized in making the other block shown with a circular groove in the bottom. This block is used in sandpapering the top of the coathanger and in similar places. The idea is that of Mr. W. A. VanDeusen of Central Manual Training School, Cleveland.



SANDPAPER BLOCKS.



INK BOTTLE HOLDER.

A simple remedy for falling ink bottles has been submitted by C. E. McKinney, Jr., of Newark, N. J. On the upper right-hand corner of the drawing board is screwed a block ⅞ in. thick, and 2½ in. square with a hole $1\frac{1}{16}$ in. in diameter. As shown in the illustration this block has been set in a little from the right-hand edge of the board in order that the board can be slipped into a rack. In a similar way a double holder can be easily made. Mr. McKinney has found the idea particularly useful for night classes or for work at home without a regular drawing table and a place for ink.

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CURRENT ITEMS

CLINTON S. VAN DEUSEN, Editor.

As a result of the work done in the summer school of Industrial Arts, at Cape May, the state board of education of New Jersey has passed resolutions strongly favoring industrial training in the public schools. One of these resolutions is: "Resolved, That it is the sense of the state board of education that a knowledge of manual training, home economics and elementary agriculture should become a part of the professional equipment of each teacher in the public schools of New Jersey.

A committee of the board was also asked to consider the propriety of adding these subjects to the list of those in which teachers are examined when securing a license to teach.

A Columbia College Extension Course in sewing has been given in Newark, N. J. this fall; instructor, Miss Winifred B. Reininger. The course covered sixty hours work. The class was limited to twenty. As it was impossible for Miss Reininger to take more than two classes and there were more than seventy applicants, a number of people were disappointed. The members are mostly teachers who wish to prepare to teach sewing in the evening elementary schools or in the summer schools, where specialists do the work.

The position left vacant last fall by Chas. A. Moore at the Mechanics Institute, Rochester, N. Y., has been filled by the appointment of Carl H. Au, a graduate of Worchester Polytechnic Institute.

Anne H. Stewart who has had charge of the bench work at the Quincy manual training center in Cleveland the past two years leaves her position for the remainder of this year on a leave of absence. The vacancy will be filled by Bertha F. Gordon of Chicago.

In November, 1906, a fire seriously damaged the nearly completed building of the Isidore Newman Manual Training School at New Orleans. This damage has been thoroughly repaired and the building is now occupied by the kindergarten and elementary departments. The liberality of its founder has supplied this school with excellent buildings and the best of equipment and an effort is made to have as near a model school as possible. Its work extends from the kindergarten through the high school and it has a teaching staff of twenty-one, the majority of them being college graduates with professional training.

H. M. Snell, who has been a teacher of manual training in the schools of Winnipeg, Canada, left last month to take charge of the organization of manual training in Sacramento, Cal.

Although the towns in Idaho are few and far between as compared with many states, yet the manual training spirit is quite active and is entering even the little log school houses. The State Normal School at Albion has one of the best equipped woodworking shops in the northwest and work in clay-modeling, basketry, weaving, paper-folding and cardboard construction are taught

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in addition to the woodwork. Students are required to complete a year's work in the shop and one in the elementary work before graduation. H. R. Shepherd has charge of the manual training department.

BOSTON.

On the 13th of December, the State Board of Education held an institute for superintendents of schools, supervisors and teachers of drawing and manual training, in the State Normal Art School. Charles H. Morse, secretary of the Commission on Industrial Education, spoke on "Industrial Education in Massachusetts." James P. Munroe, of the Munroe Felt and Paper Co., Boston, spoke from "The Business Man's Point of View". George H. Bartlett, of the State Normal Art School, spoke of "Industrial Education in the Massachusetts Normal Art School". Julius E. Warren, agent of the State Board of Education, read a paper entitled "What can the Public Schools do to improve Industrial Conditions". In the afternoon, Charles H. Morrill, of the Hyannis State Normal School, and Willis B. Anthony, of the North Adams State Normal School, told what their respective schools were doing. Walter Sargent, director of drawing and manual training in Boston, described the purpose of the course in drawing in that city. Frank M. Leavitt, assistant director of drawing and manual training in Boston, described an experiment in industrial education with young pupils.

The Mayor of Boston has at last approved the plans of the much needed addition to the Mechanic Arts High School and work has been begun upon it.

Quite a party of drawing and manual training teachers go from Boston, next summer, for an European tour taking in the exhibit of the Third International Congress for the Advancement of Drawing and Art Teaching, while in London.

The Society of Arts and Crafts is making a series of exhibits at its rooms, 9 Park Street, Boston. Those already held have been devoted to National League work, metalwork and jewelry (other than gold and silver), silver work, and jewelry and small enamels. The exhibits for the Spring are as follows: January 6-18, carved wood, mirrors and picture frames. January 27-February 8, lace and fans. February 17-29, leather work. March 9-21, ecclesiastical work. March 30-April 11, bookbinding, printing, wood-block printing. April 20-May 2, weaving and embroidery (other than ecclesiastical). May 11-23, glassware and stained glass.

Arthur Fairbanks, director of the Boston Museum of Fine Arts, invited directors and teachers of drawing and manual training in Massachusetts, to a meeting at the Museum on the morning of January 4th. Dr. Denman W. Ross of Harvard University gave a talk on the Principles of Design as illustrated in the museum collections and this was followed by an informal conference. This is the second annual meeting of this character and they are found mutually advantageous to all. —JOHN C. BRODHEAD.

NEW YORK CITY.

The annual report of the city superintendent has just been issued and contains various chapters or sub-reports by the different heads of departments. That by Dr. Haney, director of art and manual training in Manhattan and

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The Bronx is a statement of the various means taken to develop aesthetic appreciation on the part of the pupils in the elementary schools. Besides the work in the classroom it cites the measures taken by means of outside lectures and societies and by the Art Museum authorities to aid in this work.

The City Superintendent in New York was in receipt of a number of gifts during the past holiday season from individual members of the Arts and Crafts Clubs organized in different schools. Among the really execllent specimens of handwork thus presented were some beautifully bound books, folded from the sheets and various pieces of desk furniture in leather and copper. The pupils' letters which accompanied the gifts referred repeatedly to their keen interest in the work done by the clubs after school hours.

The Society of Craftsman has just closed its annual exhibition of work in the arts and crafts. This was held in the rooms of the National Arts Club and was visited by many hundreds of persons including a large number of teachers. The latter were, in several cases, accompanied by pupils, members of the various school arts and crafts clubs. The exhibition was particularly rich in jewelry, weaving and work in clay.

The New York University has organized a series of practical classes for teachers of defective children. The manual work is being given under Dr. Haney's direction in two classes—one in woodwork, taught by Albert W. Garritt, and the other in cardboard work and other elementary forms of construction by Julia C. Cremins. More than fifty classes for defective children are now in operation in the schools of the metropolis.

ST. PAUL.

There is a closer relation than ever between the art and manual training departments this year. In the sixth, seventh and eighth grades applied design is being worked out in the regular drawing work and utilized in the decorative treatment of objects worked out in the shop under the direction of the special teacher of manual training. The outlines are incised in the wood and stains and dyes are used in obtaining two and three tone work. The regular teachers are furnished with blue-prints showing typical forms and applications of design to wood decoration. A great deal of interest is manifested in this phase of the work and the results are excellent. This feature has been worked out jointly by Laura A. Williams, supervisor of drawing and Hans W. Schmidt, supervisor of manual training.

In the seventh and eighth grades block-printing is being tried in single and two-color blocks. The designs are all original with children.

The manual training department is making about 1000 small looms for the primary work, about 80 card-index filing cases for the offices of the principals and 300 large model stands for the drawing department. This work on the part of the boys has resulted in a saving of about $350 in the supply department.

In the new Parental and Detention School, now being instituted by the county and the school board, manual training is to be made a special feature. The boys will be divided into sections of about ten and they will have one hour of woodwork every day. As the classes are to be small, it will allow for

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opportunity to do individual work with the boys and influence them personally to a beneficial extent. A special course and methods will be followed in this connection.

GEORGIA.

The State Committee for the Promotion of Industrial Education met in Atlanta Nov. 15th and organized. George J. Baldwin of Savannah was elected chairman and Fred. J. Orr of Athens, secretary. A delegation will attend the meeting of the National Society at Chicago in January, and after this meeting an active campaign will be inaugurated in this State.

The Rabun Gap School, which has heretofore been conducted as a joint public and industrial school, has recently been incorporated as a thorough-going industrial school with men and women of prominence from various parts of the state as trustees and A. J. Ritchie as active manager and director of the enterprise. It proposes to reach mountain boys especially.

Classes in the manual arts department of the State Normal School at Athens have planned and will build on the campus a model four-room dwelling, designed to meet the needs of the man on the farm who is able to go to a minimum of expense in providing a home for his family. Included in the plan will be arrangements for artistic planting or landscape work about the house, and furnishing and decorating the interior. All work will be done by students. An attractive bulletin illustrating and outlining the work proposed, may be had by applying to Fred J. Orr, director of the department, Athens.

A number of the district agricultural high schools—all of which offer courses in manual training—will open in January. They will fill a long felt need in the State.

The city of Baltimore, Md. is planning to spend $109,000 during the year 1908 on its new building for the Polytechnic School. When completed the building will probably cost about $400,000 and will doubtless meet all present needs of this historic school. Many of our readers will recall the fact that this school was the first public manual training high school in the United States, being established in 1883.

The first technical school in Nova Scotia has recently been opened at Sydney. This is the first step of the provincial government in carrying out a comprehensive scheme of technical education. Other schools will be located in New Glasgow, Amherst and Halifax. A school will be established in Yarmouth having special regard to fishing industry, while the Nova Scotia technical college, modeled after the Massachusetts Institute of Technology, will be established in Halifax, and work commenced as soon as the building and plant are ready. All these institutions will be established and maintained by the provincial government, and tuition will be practically free. It is the most ambitious scheme of technical education yet proposed in Canada.

Within ten years there will be technical high schools in all of the larger cities of Iowa, according to the judgment of President Seerley of the Iowa State Normal School, as expressed at the Northwestern Iowa Educational Associa-

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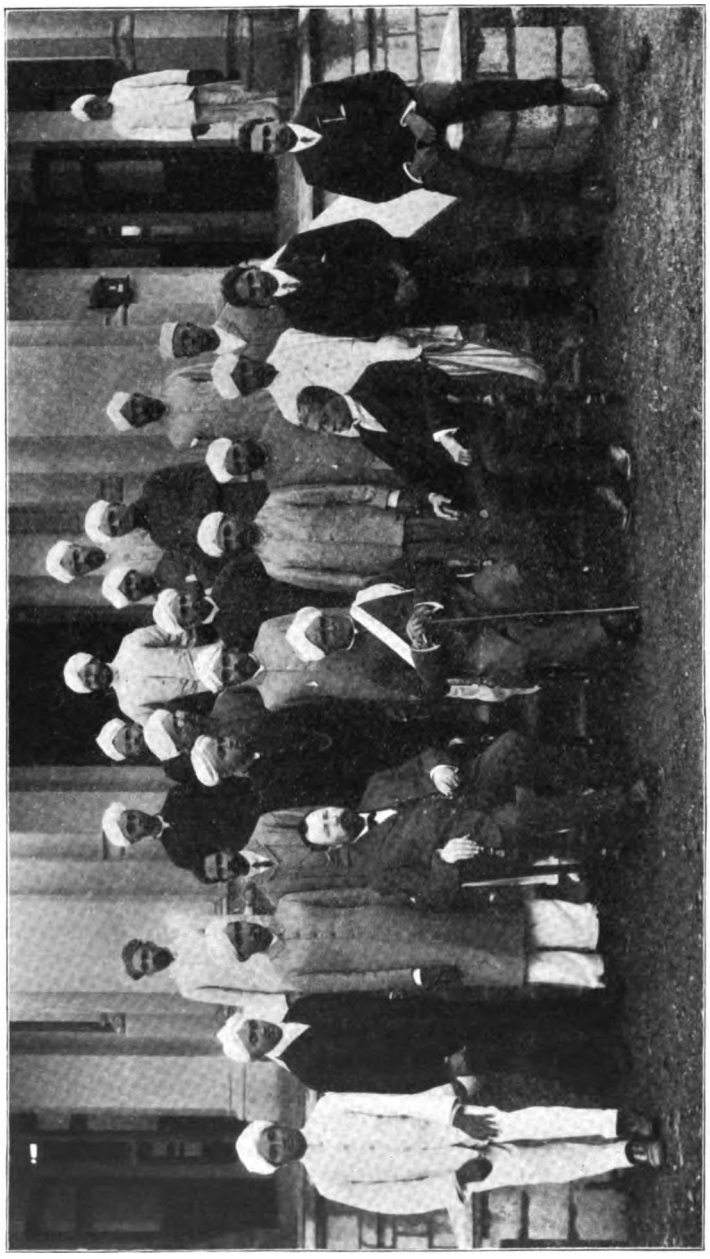

MR. LARSSON'S SLOYD TRAINING CLASS AT BANGALORE, INDIA.

In the front center of the group is seated V. P. Madhava Roa Esq., the Dewan of Mysore, on his left is H. J. Bhabha Esq., Inspector General of Education in Mysore, and on his right Mr. Larsson.

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ion's recent convention at Cedar Rapids. He declared that "The introduction of the elective courses, including commercial and other practical branches into our high schools, is but the attempt to forstall the inevitable. But the demand for technical training upon the part of a great throng of the young people of our State in those lines which will fit them for earning a livelihood cannot long be ignored."—*School Journal.*

At Winneconne, Wis., the Winnebago County School of Agriculture and Domestic Economy opened on Nov. 4 in a $25,000 building. P. Anderson, formerly of Madison has charge of the manual training and Grace Harden from the Stout Training Schools the domestic economy.

Three new schools, the Morse, the Colfax, and the Holmes, have recently been opened in Pittsburg. These three schools provide facilities for instructing nearly six thousand children. As might be expected of such an industrial city, Pittsburg has a well attended night course in its high school in which science and mechanical drawing have a place in the curriculum. There is also a night school in the midst of the mill district where mechanical drawing, shop-work, and mathematics have a prominent place. The night work at the Carnegie Technical Schools follows after the high school work and these schools are unable to care for all who apply for admission.

On the opposite page we are glad to reproduce the photograph of Mr. Larsson's sloyd training class in Bangalore, India. In this selected class are some of the most progressive educators in the province of Mysore, and as soon as they have completed the six months' course under Mr. Larsson they will go back to their homes to work out the problem of adapting sloyd principles to the social life and school conditions under which they live. Mysore is the first province in India to make manual training an organic part of its public school system.

American teachers will be interested in the following recommendation made to the educational authorities by Mr. Larsson in an address delivered in connection with the Educational Exhibition in Mysore City, Oct. 21, 1907:—

(1) That teachers who have had experience in regular school work, and have proved themselves capable of understanding the principles and practice of sloyd, should be selected to teach the subject.

Such teachers should have a special remuneration of about one hundred rupees a year, in addition to their regular salary.

(2) That suitable sloyd rooms, properly equipped, should be selected, in or near the regular school buildings. Such rooms to accommodate not more than twenty children at a time.

(3) That to begin with, children be selceted from the second, third and fourth forms, and that the time given to each child should not be less than two consecutive hours a week.

(4) That when work is satisfactorily carried on in the forms just mentioned, it should be expanded into the lower and higher grades of schools.

(5) That, in the lower grades, some correlated handwork in clay, cardboard and thin wood be introduced, and taught by the regular teachers if competent.

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(6) That, in high schools, preference be given to advanced woodwork, supplemented by wood-turning and some carving.

(7) That the objects made should be such as to be readily appreciated by the worker and should become his property.

(8) That work-benches, tools and materials used, should be, as far as possible, the product of the country, rather than imported.

(9) That a sloyd room be fitted up in connection with the Normal Training Schools to enable the students to attend the manual training as a part of their regular studies.

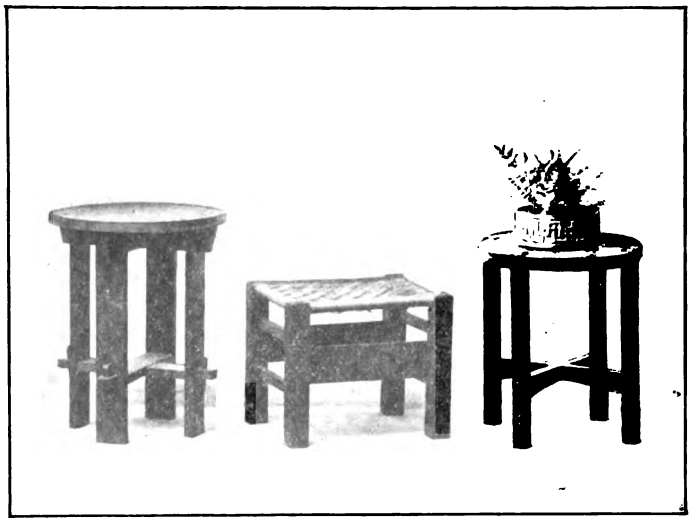
(10) That graduates of normal schools who have had manual training be selected as pupil-teachers or assistants at the various sloyd centres for at least one year.

(11) That during vacation time courses in sloyd and other handicrafts be given under the auspices of the normal schools or colleges, for the improvement of teachers.

(12) That, in harmony with sloyd, educational gymnastics should be taught as a valuable instrument for a complete general education.

(13) That such work as forging, pattern-making and machine work be placed in the technical or industrial schools.

These technical and industrial schools are needed to supply a training to the comparatively few boys who intend to specialize in a particular line of work, or to make a livelihood in some particular trade; but such work has no place in general education.



MADE AT HILL INSTITUTE, FLORENCE, MASS.

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REVIEWS

Elementary Turning, By Frank Henry Selden. Rand, McNally & Co., Chicago, 1907. 4½ x 6¾-in., pp. 197; price $1.00.

This book is for the use of manual training classes. The author intends the little volume to be used as a text rather than a reference book, for, in the introductory chapter he says, "There will be little need for class demonstration. Each pupil should have a book at his bench, and should take it home with him often enough to gain in advance a definite idea of each day's lesson." The book gives detailed instruction for turning practically all the typical forms in wood-turning, and is very fully illustrated. As each exercise is treated by the author in a particular "lesson" or chapter it is possible that the pupil with average power of application might learn to turn reasonably well if he were allowed to follow the old maxim, "If at first you don't succeed, try, try again." But the author specifically states that the exercise should not be repeated, though in the preface we find this statement: "The aim is not technique, but power—mental growth." It is doubtful, whether, after heeding these admonitions, the average high school pupil will gain power either to think clearly or do well. On the other hand, this book, when supplemented by a few class demonstrations and considerable individual teaching, will be a boon to the student of wood-turning. Especially would this be so, if, in the demonstrations attention should be given to an analysis of each individual cut, in which particular the text is lacking

The book is divided into three parts. Part I, contains thirty lessons on elementary exercises which should be taken without omissions. Part II, is devoted to thirty-two supplementary exercises and is for those who have completed Part I and wish to gain some technical knowledge of wood-turning. Part III is a treatise on tools and fittings. Part I contains the meat of the entire text for manual training purposes. Parts II and III are valuable only as supplements to Part I and are only new in arrangement of material.

The book as a whole is a contribution to teachers and pupils in its unique method of presenting the subject matter rather than in its adding anything particularly new to other texts on the same subject. The exercises, both in design and construction, are very similar to many which have long been used, for lack of something better, as manual training models in turning.—Fred. D. Crawshaw.

Universal Dictionary of Mechanical Drawing. By George H. Follows, Associate Professor of Machine Design and Mechanical Drawing, Carnegie Technical Schools. The Engineering News Co., New York, 1906, 8 x 11 inches; pp. 60.

This book is the result of an effort to standardize the conventions used in mechanical drawing and present them in practical form for the use of students and draftsmen. The material was published in the *Engineering News* before appearing in book form. It treats of an alphabet of lines, lettering, figures and dimensions, projections, sectioning and sectional views, finish marks, dimension-

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ing, titles (or what the author calls the "record strips"), nomenclature and written matter, checking, standard data, and closes with a few examples of drawings.

From the school standpoint its chief excellencies are (1) its comprehensiveness, so far as conventions are concerned, (2) the high quality of the draftsmanship it presents, and (3) the clearness with which it illustrates the points mentioned in the text. This is often done by showing what not to do along with what to do, as in Figs. 28 and 29.

One's first impression on turning to the alphabet of lines is that the author has made his system unduly complex by adopting too many different kinds of lines—fifteen in all—and as one examines the illustrations he still wonders whether so many different lines are necessary. We can agree with the author that mechanical drawing is a language and should be exact in statement, but it should also be simple and easily comprehended by those who read it. To a friend whose education has been limited to the common schools one would not write a letter containing French phrases, even if they did express one's particular shade of thought better than English alone. So a draftsman should take into consideration the men who are to use his drawings. It would seem to be a difficult and expensive task to educate a shop full of workmen, or even a class of bright high school boys, up to the fifteen-line standard set in Professor Follow's book.

On the other hand, it is evident that the lines most frequently used in the drawings shown are in harmony with the best practice among draftsmen generally, and that in most kinds of business satisfactory drawings could be made without adopting more than eight or ten of the lines shown.

The book is sure to arrest the attention of all who are interested in the subpect it treats. —B.

Education by Plays and Games. By George Ellsworth Johnson. Ginn & Company, Boston, 1907. 7½ x 5 inches; pp 234; price illustrated 90 cents.

"We have here at last a curriculum of plays and games, graded by age from infancy to middle teens, and also analyzed so as to show the chief mental and physical activities involved in and developed by each of them. Not only age and sex but season as well is taken into account. It is essentially a new book with a field of its own."

The above quotation from the introduction by President G. Stanley Hall gives a brief summary of the book. The first part discusses the meaning of play, play in education, and the periods of childhood and their relation to a course of plays and games. The second part consists of a suggestive course of plays and games, dividing the child's life up to fifteen years into five periods.

The book contains many suggestions for "constructive plays" and for that reason, especially, it should receive the attention of manual training teachers. But every teacher in the elementary schools ought to be better able to understand and interest children after having read this book.

Syllabus on Wood and Woodworking. By William Noyes. Published by Teachers College, Columbia University, New York City; price 10 cents.

This is by far the most scholarly and comprehensive outline of a manual training subject that has ever been published. After even a hasty examination of

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this syllabus no one could say that woodworking is lacking in valuable subject matter. Tools, measuring of wood, woodworking, common joints, principles of joinery, forms of joined structures, fastenings, wood finishing, structure of wood, properties of wood, seasoning of wood, principal species of wood, distribution and composition of the North American forest, the forest an organism, the life of the forest, natural enemies of the forest, exhaustion of the forest, forestry, uses of the forest, lumbering, saw milling—these are the chapter headings. The subject of each chapter is analyzed and presented in outline form, followed by references to books and magazine articles for each subtopic outlined.

A Brief Course in Machine Drawing. By Frank E. Mathewson. Series I of Supplementary Notes for Mechanical Drawing. Taylor-Holden Company, Springfield, Mass., 1907. 6 x 9-in.; pp. 23; paper covers, price 40 cents.

This series of problems has been arranged to meet a demand for a brief course in machine drawing for classes where only a very limited amount of time can be given to the subject. It may be used in connection with or supplementary to the author's book, *Notes for Mechanical Drawing*, published four years ago, or it may be used independently. It seems to be especially suitable for a Y. M. C. A. or other class of mature students who are desirous of learning to read and make simple working drawings in the shortest possible time.

So far as quality is concerned, it is sufficient to say that it corresponds to Mr. Mathewson's former publications and these have won merited popularity.

Peirs' Mathematics for the Machine Shop. By Frank Peirs, formerly Instructor in Machine Construction Drexel Institute. Published by the author at 223 North 20th St., Philadelphia, 1906. 3½ x 6-in.; pp. 78 + 44 blank pages for notes; price, bound in flexible cloth, $1.00.

This is a convenient pocket book for the use of machinists and tool makers. It is a small volume intended to help in the solution of those particular problems which are most likely to arise in a machine shop. In addition to a great variety of problems in pure mathematics it treats of simple and compound gearing for screw cutting, cutting spirals on the milling machine, spiral gears, spur and bevel gears and worm wheels. It also gives a number of useful tables.

The following have been received:

An Arts Course for the Grades. This booklet of sixty-one pages comes from the Chicago Normal School and contains the following chapters: (1) Considerations in the Devising of an Art Outline by George W. Eggers; (2) How Curricula in the Manual Arts might be Planned in Outline by Frank M. McMurry and Oscar L. McMurry; (3) Modeling by Antoinette Miller; (4) Work in Textiles by Edward F. Worst; (5) Bookbinding by Oscar L. McMurry and George W. Eggers; (6) Elementary Course in Furniture and Apparatus Making by Oscar L. McMurry and George W. Eggers. Many of these outlines are illustrated with photographs and drawings.

The Corner Stone of the Commonwealth. A description of the Technical High School at Springfield, Massachusetts. A well printed and beautifully illustrated booklet.

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Course of Study for the Kindergarten and Grade Schools, Peoria, Illinois. Contains outlines for manual training, domestic science and arts.

An Outline Course of Study on a Scientific Basis. Report of a committee of the Superintendents' and Principals' Association of Northern Illinois, Supt. W. H. Hatch, Oak Park, Chairman.

Manual Training Number of the Bulletin of the Northern Normal and Industrial School, Aberdeen, South Dakota, October, 1907. Contains an article on "Industrial Education in the Public Schools" by H. W. Mansfield, and one on "Trained Teachers for the Rural Schools" by S. C. Hartrauft, also illustrations of furniture, forgings and a model house made by students.

An Outline of Manual Training for the Grades by Albert G. Bauersfeld, instructor in woodworking at the Thomas Hoyne Manual Training School, Chicago. This is a 22 x 29-in. chart published as a supplement to No. 12 of the Ohio State University Bulletin, Columbus, Ohio. It is accompanied by a descriptive article. The chart is the result of an anylitical study of the several forms of manual training now found in the elementary schools, with reference to (a) media of expression, (b) fundamental principles and processes, (c) successive projects, (d) new tools, (e) materials, (f) design and constructive drawing, and (g) correlated work based on social and individual needs.

Manual Training. By L. H. Burch. This is the title of a series of helpful articles for rural schools now running in *The School News* published at Taylorville, Ill. The article in the December number contains a most interesting letter from Etta Knowles of the Oak Grove School giving her experiences in starting work in manual training in a district school. After one has read this letter and examined the three illustrations accompanying it, he realizes better than ever before some of the possibilities, as well as the limitations, of manual training work in rural schools.

Vocational Work for the Elementary School. By James Parton Haney. A reprint from a timely article published in the Educational Review for November, 1907.

Report of U. S. Commissioner of Education, Vol. I. For the year ending June 30, 1906. The United States Bureau of Education, Washington, D. C.

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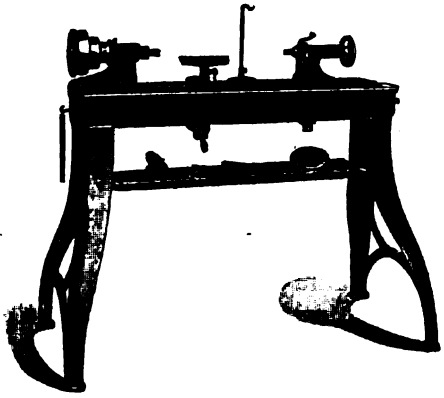
OUR LATHES EMBODY



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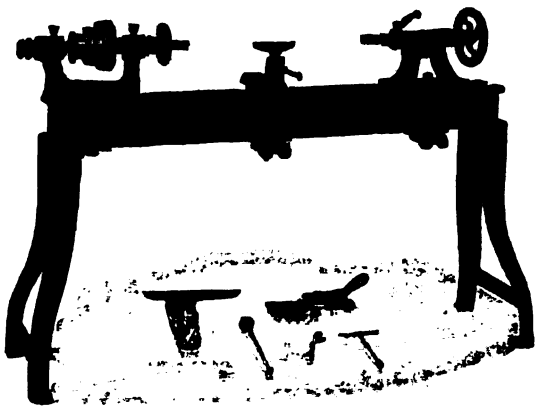

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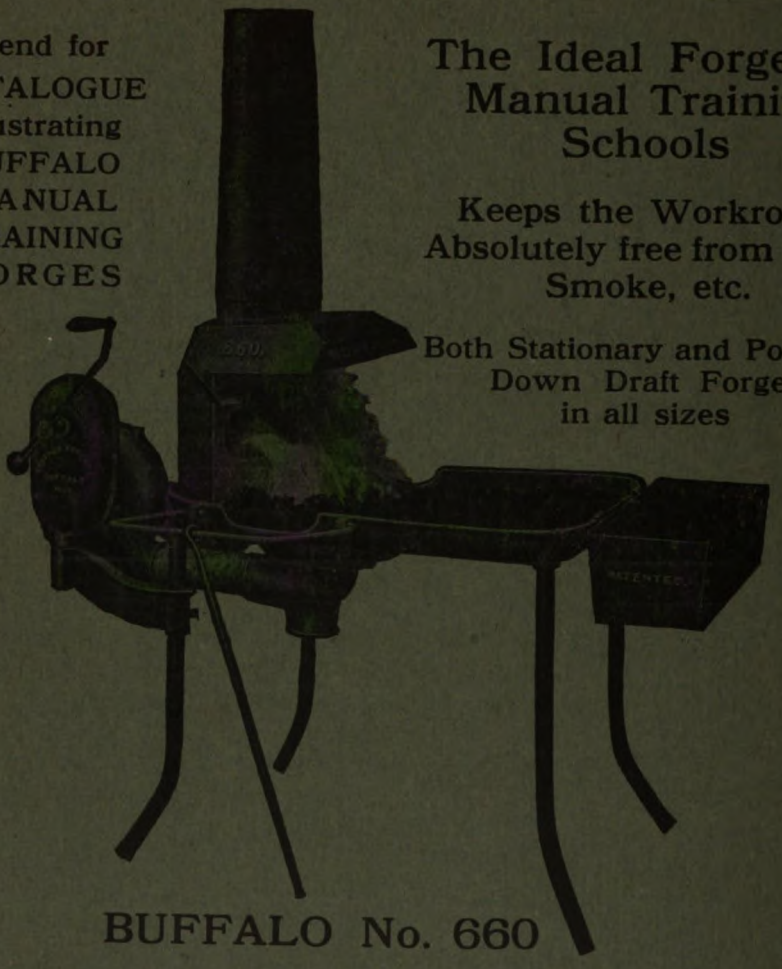

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Vol. IX APRIL, 1908 No. 4

MANUAL TRAINING MAGAZINE

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MANUAL TRAINING MAGAZINE

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Our June Number

It is expected that our June number will contain the following articles:

"Coping Saw Work," by *B. W. Johnson,* supervisor of manual trainnig, Seattle Washington. This article on fourth-grade work reveals the free and progressive spirit of the Northwest. The article will be illustrated with several good drawings and photographs.

"A Study in the Development of Transportation," by *William R. Ward,* instructor in manual training, State Normal School, New Paltz, N. Y. An account of what has been done with a class of sixth-grade boys and girls.

"A Course of Study in Manual Training." The fourth article in the helpful series, by *Cheshire L. Boone.*

"How the Schools May Help the Forestry Movement," by *T. B. Kidner,* director of manual training and household science, Province of New Brunswick. This includes an outline of lessons which are practical in connection with manual training work in wood.

"Rooms and Equipments for Manual Training School Buildings," by *Fred D. Crawshaw,* principal of Franklin School, Peoria, Ill. A comparative study of three types of buildings for manual training high school work, from which some helpful equipment formulae are deduced.

"An Appreciation of Cardboard Construction," by *John C. Brodhead,* Assistant Supervisor of Manual Training, Boston, Mass. This article discusses cardboard work with reference to conditions in the grade schools of a large city.

"Interest Aids in the Grade Shop," by *Louis C. Butler,* Eads Avenue Training School, St. Louis, Mo. This also deals with actual conditions in a large city.

Among other articles expected in the near future is one on art metal work by Augustus F. Rose, and another on kites and kite making as developed in the Los Angeles public schools.

See page XXXV for announcement of Competition No. 5—five prizes for wash drawings.

The Manual Training Magazine is kept for sale at McClurg's in Chicago, and Brentano's in New York

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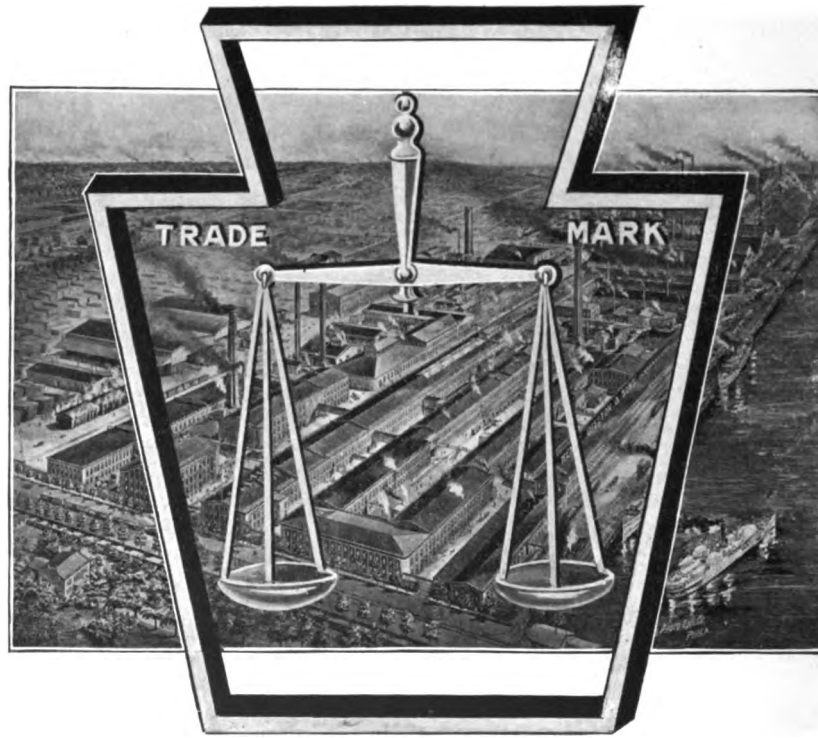

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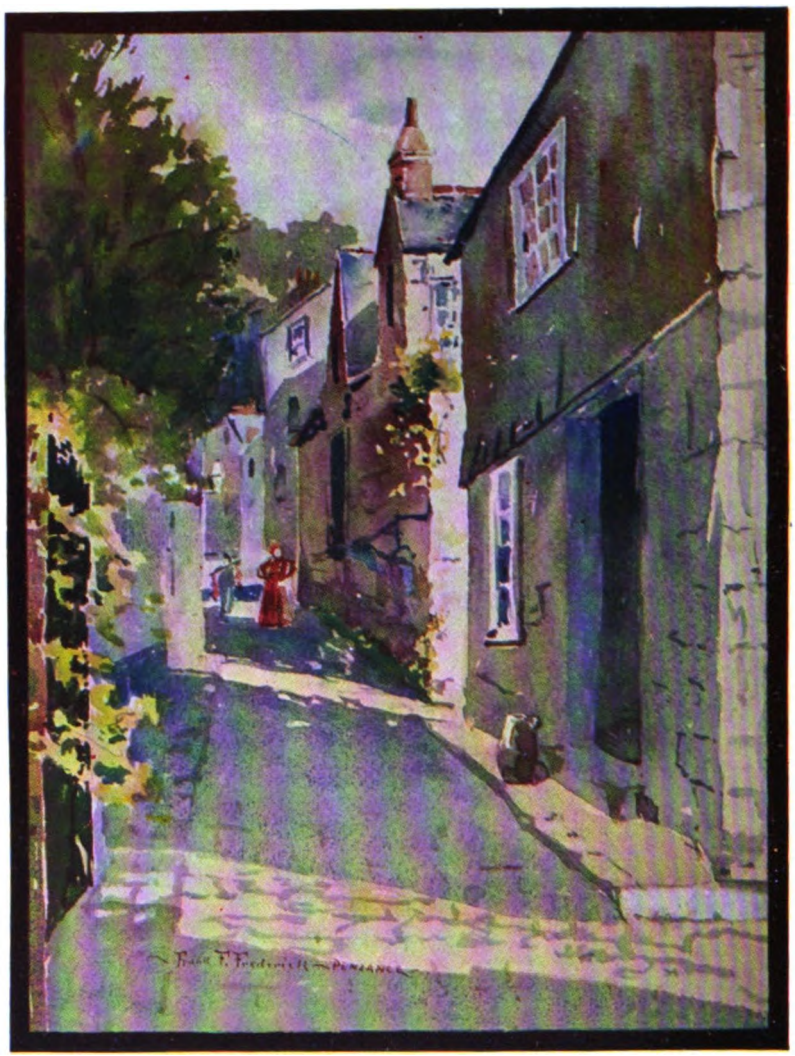

OLD STREET IN PENZANCE, ENGLAND.

FROM A WATER COLOUR DRAWING BY FRANK FORREST FREDERICK.
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VOLUME IX. NUMBER 4

MANUAL TRAINING MAGAZINE

APRIL, 1908

THE EFFECT OF TRADE SCHOOLS ON THE SOCIAL INTERESTS OF THE PEOPLE.[1]

GRAHAM TAYLOR.

THE trade schools must be considered in relation to the public schools in order to forecast any appreciable effect they are to have upon the social interests of the people. For nothing less prevalent and effective than the system of public education provided by law and supported by taxation, or at least that part of it which is made compulsory, can be said to have any direct social effect upon the whole people. Of course anything which, like our technological schools, directly affects any large group or class cannot fail indirectly to affect the whole mass. The mechanical, electrical, mining and civil engineers they graduate, help make work and raise the standard of efficiency beyond the lines of their employment. But the direct influence of these schools has been more limited to the ever increasing numbers of those educated by them than was hoped when many of them were founded. Much as they have done to increase the efficiency and opportunity of those within whose reach their advantages have been placed, they necessarily start on a plane far beyond the reach of the rank and file of American labor.

If the trade schools are on the one hand to leave the technological schools alone in their sphere of higher attainment, they must on the other hand not only be a part of the public school training, but must influence all their elementary grades, in order to train enough tradespeople to promote the common welfare. It is not enough that the seventh and eighth grades should provide for the distinct classes of pupils: first, for those who intend to graduate into the regular literary and classical high schools, and second, for those who have special aptitude

[1]Read before the Society for the Promotion of Industrial Education, Chicago, Jan. 24, 1908.

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and purpose to enter the manual training and commercial high schools. For our industries and our people both need the creation and development of this very aptitude and purpose among the rank and file. It can be done most surely, and perhaps with the majority of school children only, in the earlier years and in the elementary stages of their schooling. Not only do most of the school children at our industrial centers fail to go beyond the sixth and seventh grades, sometimes from lack of opportunity and more often from lack of inclination; but they fail to have either their interest or aptitude for skilled pursuits elicited at all, if it is not done before they reach the sixth grade.

Therefore one of the most valuable results to the people in the movement for trade schools will be the necessity to prepare pupils for these schools by introducing various forms of training in manual work and the arts of common life all through the grades of our public schools from the sixth down to the kindergarten. The practical utility as well as the educational value of this early industrial training, has been notably demonstrated in this city by the co-operation of generous private citizens and public school authorities and superintendents. This work at the Tilden School, situated in one of the neediest districts of Chicago, has been patiently and persistently sustained by one of our foremost manufacturers until it is recognized to have trained all its children in the most necessary arts of living, and to have laid the basis for their higher occupational training. From the kindergarten up through the sixth grade, they are progressively trained to use their hands and eyes, their touch and taste in constructive work with wood, iron and textiles; in laundrying, cooking and sewing; in designing and making things.

Not only has the continuation in the seventh and eighth grades of this elementary work been conceded by the teachers to have added incentive and opportunitiy for the children to prolong their schooling, but it is confidently expected to assure all the pupils which the proposed trades schools can possibly train.

The social interests of our family folk thus to be promoted are inestimable. By prolonging the school age from the fourteenth through the sixteenth year, both by voluntary motives and compulsory measures, the period of greatest danger to the boy and girl, and therefore to the community, would be better safeguarded than in any other way. The social and economic waste in the fustration of these two most formative years in the discipline and character of the child, is to be measured not by the number of boys and girls who fall into delinquency and dependency in this critical period of their physical and mental development,

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but also by the loss to our industrieis and commonwealth of all the powers and capacities for productive skill which fail to be developed. From the burden and menace of increasing juvenile delinquency and dependency some of our greatest cities are moving to protect themselves by increasing the compulsory school age to cover the sixteenth year so as to assure every child the discipline of the school, unless it is assured the discipline of the shop. Surely, therefore, the common welfare of our whole people both warrants and demands the provision at public expense of an industrial training, adequate not only to develop the interest of the children previously elicited through their earlier school life, but also to fit and prepare them to earn their living and contribute to the wealth of the commonwealth in the trade or occupation for which they prove themselves to have the best aptitude.

To facilitate the child's choice of a calling by the development of interest and aptitude will be of great advantage to each individual. It might also develop in this country, as it has for centuries in Europe, an hereditary skill in certain trades, which might be, here as there, the richest heritage which one generation can give to another, and which might add new resources to the nation's capital in trade. The craft and trade secrets which were once the jealously guarded treasures of the old craft guilds in the middle ages, would be the open secrets of our age,—open to any and all who prove themselves capable of learning and using them.

The interests of the whole people, however, would have to be safeguarded from the abuse of an unlimited apprenticeship by the monopoly of natural resources and by the limitation of the opportunities for skilled labor. For the wages and standard of living, even in skilled trades, would be at the mercy of monopolists whenever or wherever they could control the access to natural resources and the tools of machine production, and at the same time command an unlimited supply of skilled labor. The caution of our trades-people is therefore natural enough. It is born out of many a bitter experience with the fever and chill of seasonal trades, with the occasioinal and often protracted periods of entire lack of employment, and with the restriction of more and more workers to some minute part of a trade which affords little or no opportunity for increase of either wages or expert skill. While we are discussing the increase of skilled working people, we must not forget the thousands of unemployed now in this city and at every other industrial center, even in Germany where trade schools have had their greatest and longest development.

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The social interests of the whole community also demand that the curriculum of the trade schools should add, to the training in the mechanism of industry, instruction in the history, psychology and ethics of industrial relationships. For nothing is more sadly apparent than the neglect of the human factors in industry which has proved as un-businesslike in its waste of energy and efficiency, as it has been inhuman and divisive in the life of every industrial community. There are cheering signs that both employers and employes are coming to their human senses in demanding, conceding and providing for the personal considerations involved in their industrial relations with each other. Nothing is at this moment more essential to the success of this auspicious movement for trade schools than for this convention to make frank and full avowal of the necessity to recognize the human elements on both sides of its problem. For to attempt to include training for the trades in the American public school system without securing the initiative and cooperation of the trades-people whose interests are most vitally involved in the project and whose children must be the pupils in the proposed schools, is like trying to play Hamlet by leaving Hamlet out.

If exploitation be barred by just legal safeguards and by the organized self-protection of the group or class most in danger of being exploited, the wealth producing capacity of our whole people will undoubtedly be promoted by trade schools placed within the reach of all. The introduction of greatly increased numbers of trained and disciplined people to the ranks of the wage earners in all the skilled trades, through the agency of these free, public trade schools, will undoubtedly make possible a vast development of our country's limitless natural resources. It will as surely add such strength to the leadership and rank and file of self-protecting trade organizations that organized craftsmen will be better able than ever to protect their property rights in their own skill and in the products of their own toil. The social interests of the whole people cannot fail to be greatly promoted by trade schools, which at the bottom strike their roots into the manual training of the elementary grades in our public schools, and blossom at the top with the hope, assured to all, of enjoying the fruits of each one's own toil and skill without fear of exploitation.

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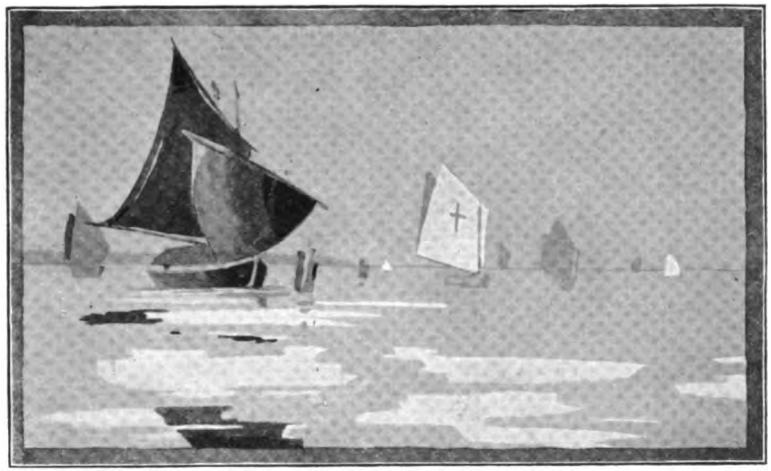

THE WASH METHOD OF HANDLING WATER COLOUR.

FRANK FORREST FREDERICK

THE gentle art of laying flat washes of water colour seems in a fair way to be lost. Our art teachers, fascinated with the delights of wet paper, broken values, accidental effects and the beautiful quality to be obtained with freely running colour, forget that there is a beauty in a clear, even and transparent wash, and that in the art-trades the latter method is used while it is only the painter of pictures who uses the former. Many a boy in the high school who shuns the water colour class would be only too glad to undertake the work if he saw in it any application to architecture, engineering, or the allied professions.

It is not always possible to find picturesque subjects for this method of rendering, but halls, corners of rooms and views from windows are often interesting, while photographs of historic buildings or good examples of architecture provide subjects of value not alone for the practice of translating the values of the photograph or print into values of colour.

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The best way to learn the handling of washes of colour is to begin with one colour, as ivory black, or charcoal gray. Roman sepia in the cake, ground upon a plate as needed, was used for the drawings reproduced in connection with this article. These drawings were executed upon stretched Whatman cold pressed paper. Rough paper, except for large work, should not be used.

The best way to stretch a sheet of paper is to immerse it in water for an hour or more in a bath tub, sink, or shallow wooden box made for the purpose. When entirely saturated, roll the sheet in a dry towel for a moment to remove all surface water. Put it face downward upon a drawing board and lay a band of glue or strong paste about one-half inch wide around the four sides, then turn it over and press the glued edge upon the board by rubbing briskly with any smooth instrument as the end of a closed pocket knife. Upon no account stretch or pull the paper when fastening it upon the board for its immersion has swelled it equally in all parts and if laid upon the board evenly it will dry perfectly flat.

The method followed in the execution of the accompanying illustrations may be described under three heads:

THE DRAWING.

As paper has a very sensitive surface no erasures should be made where colour is to be applied, and the first experiments in the composition or placing of the subject should be carried out upon another sheet. When this seems satisfactory, lay it aside for future use, and with a hard pencil (4H) held within the hand like an oil paint brush, the leading lines and masses of the composition should be indicated. These lines are not erased, but over them—using T-square, triangles and rulers where necessary—a careful and very complete drawing is made, indicating, especially, widths of mouldings and the thickness of walls at window and door openings. The details in the shade and shadow of the drawing made to illustrate this method of work were as carefully and completely drawn as those in the light. The drawing upon the illustrative plate was lined in with a pen dipped in sepia that it might reproduce with the remainder of the plate; but, of course, the drawing should be left in pencil when washes are to be applied. Note that the stones of the pavement are all drawn. One can never tell just what detail will be brought out later, and the only safe way is to draw it all.

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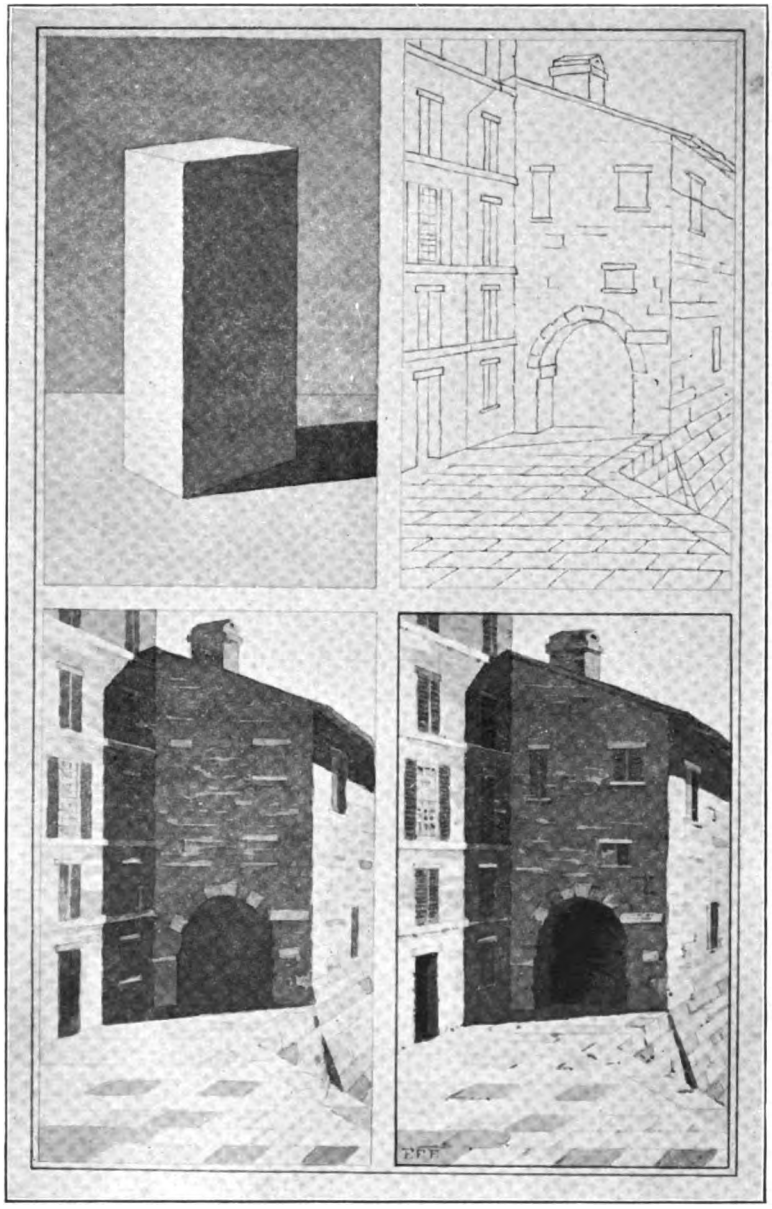

PLATE TO ILLUSTRATE THE WASH METHOD OF HANDLING WATER COLOUR.
ORIGINAL SIZE, 7½ x 12¼ INCHES.

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If this had not been done the few lights showing in the shade could not have been properly placed. *Too much stress cannot be laid upon the necessity of a complete drawing* before the brush is touched. Changes cannot be made while the work is in progress. The application of the washes is almost the least important part of the problem. I often spend an hour upon a drawing to every five minutes spent upon the washes.

THE WASHES.

While the drawing is in progress determine its treatment in wash. Accept as a general principle that while there should be one white and one very dark area in the drawing, preferably near the centre of the composition and never in the distance, the greater part of the space should be covered with light washes. It is a good plan, with a soft lead pencil, to scribble over the preliminary sketch mentioned above, thinking out the location and intensity of the values to be used. When these questions have been settled, pass a wash of clean water over the entire drawing to clean and soften the paper. When this is dry and the paper entirely flat, pass a wash, so light it can scarcely be seen, over everything that is not to be white. Use for this a large brush and apply the wash as mechanically as if white-washing a wall. On the illustrative plate this wash can be seen on the top of the prism and on the sky of the drawing below. The light surface of the prism, parts of the nearest wall and several of the stones of the pavement were left white, though they do not appear white on account of the screen used in making the plate from which the reproduction is printed. The light sail and the lights upon the water in the foreground of the drawing of Venetian boats, all the light in the lower part of the Aisle in Westminster Abbey, and all the nearest lights in the Castle on St. Michael's Mount were left white. This first light and almost invisible wash serves a three-fold purpose. It definitely locates the whites, it prepares the surface of the paper for darker washes, and it serves often, as has been pointed out, to form part of the picture. After the first wash is dry a second, but little darker, is floated over the drawing, leaving out the whites and the areas that are to be left of the value of the first wash. This second wash forms the foreground of the prism drawing, and shows upon the light side of the chimney and the upper part of the left wall of the drawing below. The wash was passed over everything in these drawings—including window shutters, paving stones, etc.,—that

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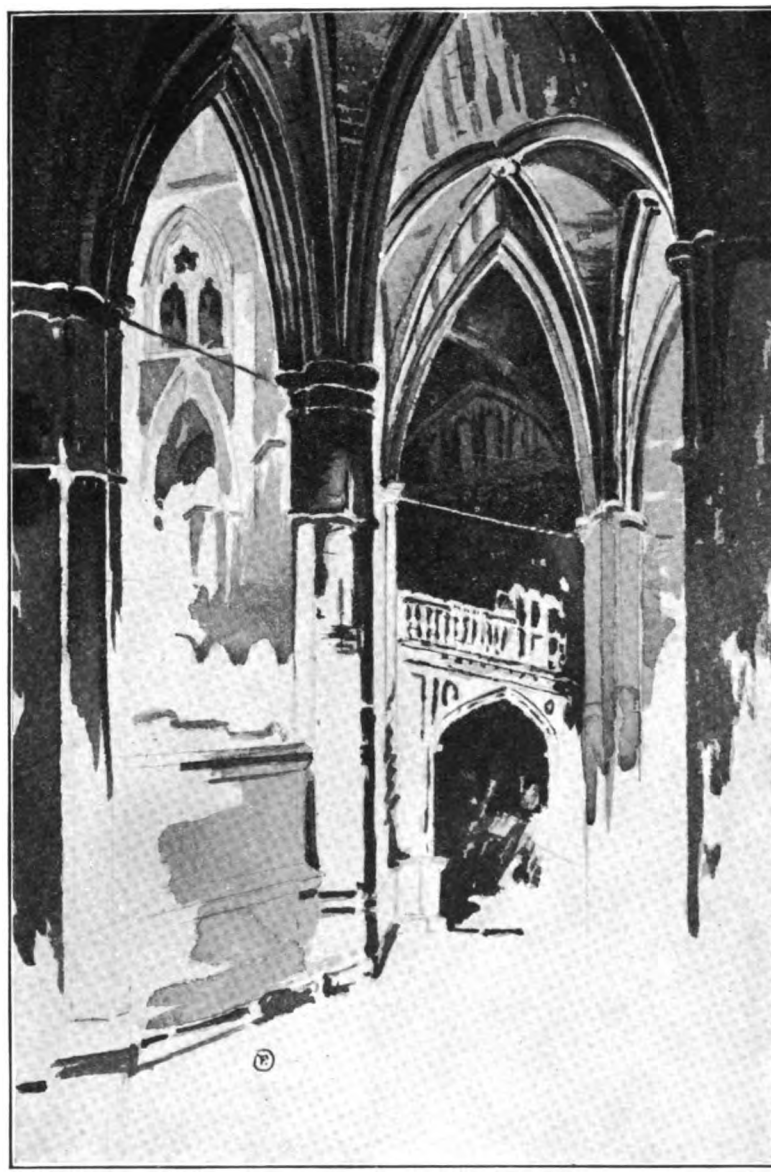

AISLE IN WESTMINSTER ABBEY.

A WASH DRAWING BY FRANK FORREST FREDERICK. ORIGINAL SIZE 6¾ x 10 INCHES.

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is darker than the white and the first light wash. If a graded sky or clouds is to be shown, it should be done with the second wash, which should be rather strong at the top and gradually diluted till it reaches the horizon or the foreground, as the subject may demand.

No gradations whatever are shown upon the illustrative plate.

When the second wash is dry, take a small, pointed, "springy" brush, and, keeping it full, with a blotter handy to dry it when necessary, build up the picture by passing washes over everything, including the foreground, that is darker than the preceding washes. Pass these washes over as much of the composition as possible, keeping all shadows of the same value as the shade sides of the objects casting them; and, lastly, add the shadows. If the drawing is executed in two or three washes only it is likely to look thin and cheap like an etching printed from a wiped plate. The drawings on the illustrative plate were executed in five washes, of which two have been described, while the third passed over the background of the prism, its shade side and shadow, the fourth over shade side and shadow, and the fifth over the shadow. In the drawings below the prism the third was passed over all shades and shadows and the shutters on the light wall, the fourth over the same areas except the window caps and the irregular surfaces where the stucco had fallen off, and the fifth over the shadows and the archway. The same values were used for the prism and the architectural subject.

A common mistake made by beginners is to leave the lights in the shades too light. Very little modeling in shade areas is needed, and lights in shades should never be left till three or four washes have been put on. At this stage of the work the student's drawing will probably look weak, and, if the washes have not been clean, and sharply confined within the proper boundaries, "woolly;" and the temptation to drop in darks and accents will be great; but strength will be obtained by strengthening some values and grading others. In this method of work light washes cannot be floated over other washes as dark as shadows should be without losing transparency, and, therefore, the shadows should be added last.

THE ACCENTS.

Reward for the self-control necessarily exercised to carry the drawing on in the broad, simple way described above, will come with the addition of the accents. By accents is meant touches to represent

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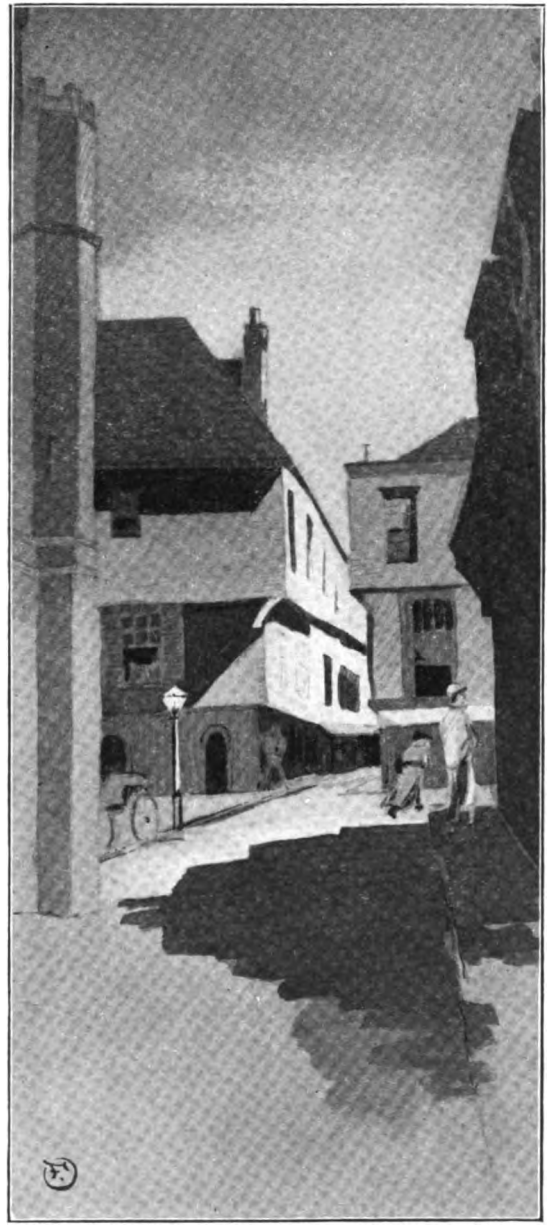

STREET IN CANTERBURY, ENGLAND.

FROM A DRAWING IN PENCIL AND WASH ON TINTED PAPER
BY FRANK FORREST FREDERICK.

ORIGINAL SIZE, 4¼ x 9¾ INCHES.

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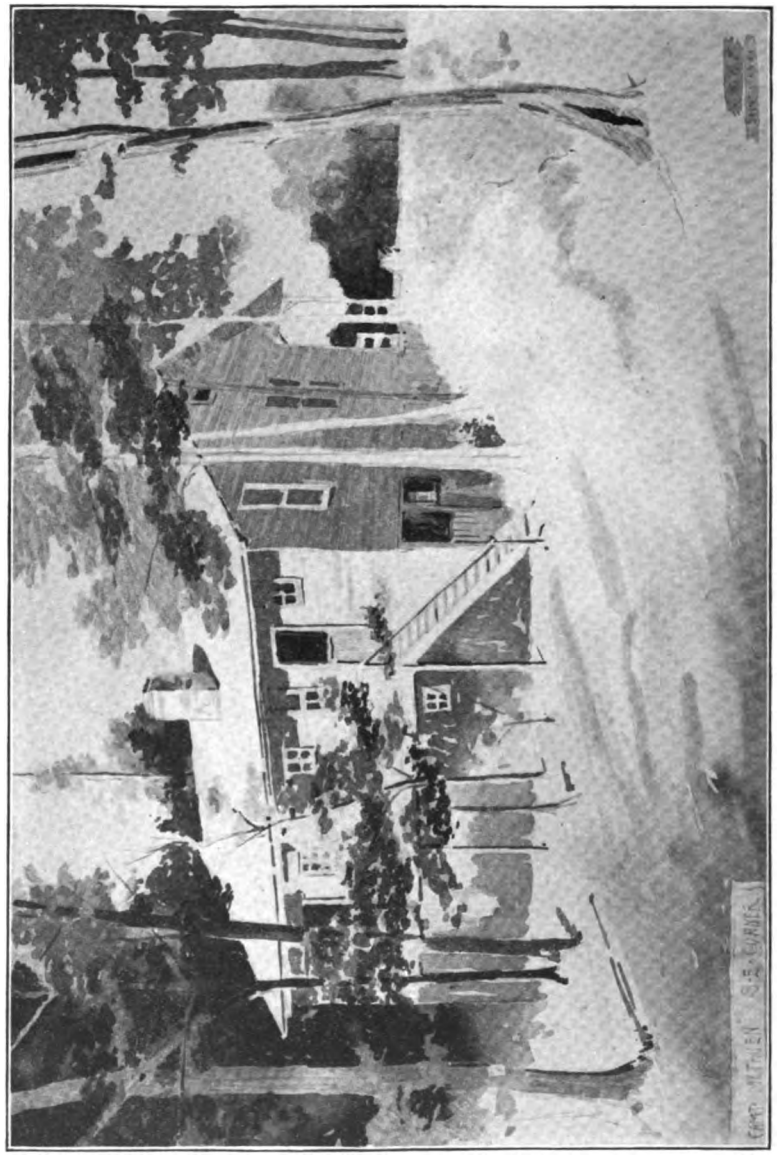

"CAMP METHUEN," MACATAWA, MICHIGAN.

FROM A DRAWING IN PENCIL AND WASH BY FRANK FORREST FREDERICK. ORIGINAL SIZE, 8 x 11¾ INCHES.

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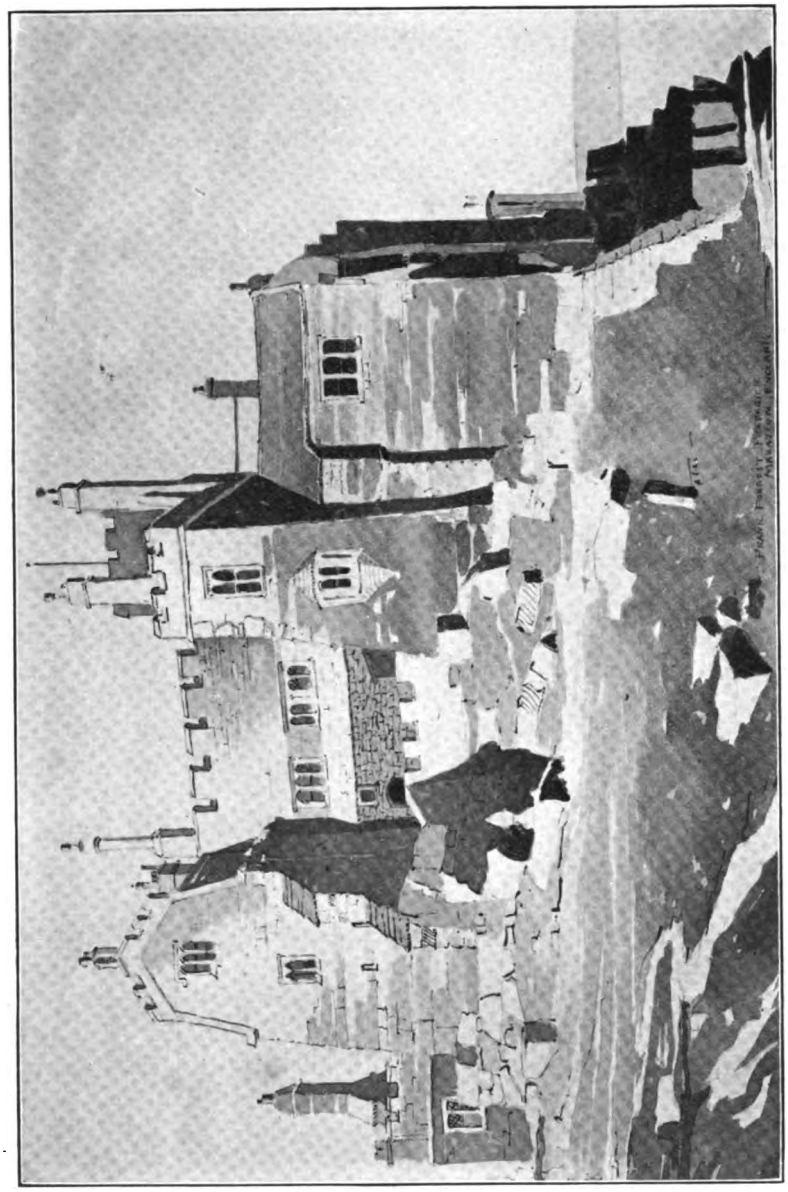

CASTLE ON ST. MICHAEL'S MOUNT, CORNWALL, ENGLAND.

FROM A DRAWING IN WASH AND PEN BY FRANK FORREST FREDERICK. ORIGINAL SIZE, 7¼ x 12 INCHES.

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windows, lines to bring out mouldings or architectural enrichment, dark branches of trees, and, last of all, the darkest spot. These should be applied with the point of the brush in the form of drops in puddles, dark or light as required, and allowed to dry slowly. Too many accents give a spotted effect. It may be said, in general, that subjects of the character here reproduced can be rendered with three groups of values, —one group of two or three washes for the sky and the nearer sunlit areas, another for the distance and the foreground, and the third for the shades and shadows. These, to repeat briefly must not be applied in the manner of mosaic, but built up by repeated washes—each wash covering less area than the preceding, till the last and darkest is a spot of the full intensity of the pigment.

The drawing of the Aisle in Westminster Abbey was executed upon but three light washes with the point of the brush, but beginners should not attempt a subject requiring this treatment.

It is worthy of notice that of the thousands of drawings by Claude and Turner and the early English water-colourists to be seen in museums, all are executed in the method described above or in wash combined with pen or pencil work. Turner, who later handled water-colour with the greatest possible freedom and strength, always executed his earlier drawings in pure wash or in pen and pencil point combined with wash. This is an excellent method and should be more generally practiced. The drawing of "Camp Methuen" here reproduced was rendered in pencil and then washed over with sepia. The drawing of the Castle on St. Michael's Mount was washed first and later worked over with the pen.

Variety may be obtained by working upon tinted paper in Turner's manner—washing in the shades and shadows and adding white for the lights. The Street in Canterbury illustrates this method.

After working in monochrome wash until the student has become skillful in handling one colour, it is then, and only then, time to attempt full colour; and it will be an easy step to take. The same method should be followed—keeping all clear and clean as did the English water-colourists—working in the wash method upon stretched paper.

My own water colours, which are certainly not dull and muddy, whatever else may be said of them, are all painted with yellow ochre, rose madder and cobalt. When strength is wanted, carmine takes the place of rose madder, and Prussian blue the place of cobalt. Light red is added for brick walls, and pale cadmium sometimes takes the place of

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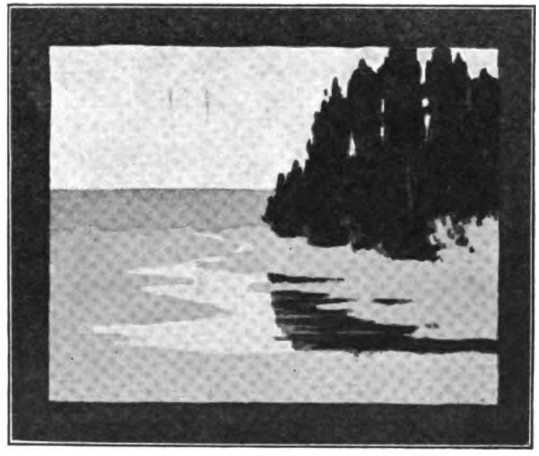
yellow ochre; but with the gray resulting from the first three pigments mentioned, which are blended rather than mixed together, the effects, are obtained. In my box is also gamboge, used to obtain the very little actual green that we see in nature. The vines hanging over the walls in the Old Street in Penzance here reproduced (see frontispiece) were washed in with gamboge and the other washes brought up to it.

It is poor economy to use anything except the best pigment. All of the "school" and low priced pigment should be avoided.

Mr. Alfred East said in a recent article that most students of landscape wish to "canter before they can crawl." We very properly give much attention to landscape work in our public school art instruction, but all have noticed that after the very beautiful and suggestive work executed in the lower grades there is no progress, and the ability to feel and express landscape apparently dies before the high school is reached. If the study could be pursued in some more systematic manner this might possibly be changed.



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SOME EXPERIMENTS IN ELEMENTARY MANUAL TRAINING.

HARRIS W. MOORE.

LIKE the habit and manners of Portia's English suitor the influences which have been shaping the manual training work in the Watertown grammar schools have come from nearly everywhere. Once in the days when models were carefully packed away by the manual training teacher and kept till the close of school in June, a certain ninth grade boy, who had done well in his work, found that he had made only two models during the year for which he cared enough to take home. The teacher was sorry to find that the year's work was evidently so barren of outward results from the boy's standpoint. The design of a certain small shelf to be made of pine pleased the teacher because it brought in so many good exercises and operations and, withal, looked so well when completed; but the remark of a boy that he wouldn't put up such a shelf in his home made the teacher think that after all there was something wrong with the model. After looking over the rather formal models and exercises in one of our best known manual training high schools, I asked the instructor in woodwork whether the boys who had done benchwork in the grammar school did good work on those models. When he replied that he got better results from the boys who had received no such training in the grammar school, I began to wonder if there was not something of vital interest lacking in the course of models. It was not so much a lack of ability in the first group of boys as a lack of incentive for careful workmanship. When a boy sees the need of accuracy in his work he will strive to attain it.

President Hall at Clark University and Mr. Larsson at Boston have gathered interesting collections of boys' spontaneous constructive work which are rich in suggestions to manual training teachers who are interested in the boy's side of the model. The workmanship is for the most part distressingly crude but the models answer their purpose in the boy's life, and the accuracy attained is, like Touchstone's country wench, "An ill-favored thing, sir, but mine own." In his book on Adolescence, President Hall has severely criticized the usual courses in manual training, and his suggestions as to toys and scientific apparatus have appealed to me as being a good line along which to work. When

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the present work was undertaken in Watertown the aim of the superintendent was to make all school work just as far as possible of real, vital interest to the pupils,—real from their standpoint and vitally connected with their child life,—something appealing to them as worth doing. In a certain school somewhere a zealous woman had "the thirteen successive steps" in the making of a wedge (I think it was) all illustrated by samples on the wall. Have not we adults too often taught by the analytic method when the child's interest demands a whole instead of a part? I freely admit that sometimes the whole is so impetuously interesting that the boy can hardly wait to get the parts properly assembled before trying to see if it will "go;" but still I contend that there are other values, perhaps not so tangible as to be tested with rule and trysquare, that ought to have consideration by us teachers. In "Prue and I" George William Curtis suggests the kind of teacher whose work is of lasting worth: "My grandmother sent me to school but I looked at the master and saw that he was a smooth, round ferrule, or an improper noun, or a vulgar fraction, and refused to obey him. Or he was a piece of string, a rag, a willow wand, and I had a contemptous pity. But one was a well of cool deep water, and looking suddenly in one day I saw the stars."

Experience was my only instructor in my grandfather's workshop on the farm, but that was sufficient to delight the boy with bows and arrows, darts, guns, traps, wagons, boats, windmills, and waterwheels. I couldn't or didn't plane a glued joint till I reached the technical school, but I have ninth grade boys who can plane one well now. Theoretically I agree with the teacher who said that the only proper tool to make a wheel with is the lathe, but shall we therefore let the boy wait till he is in the high school before making a wheel for his box-cart?

These are some of the influences which have resulted in such models as are described and illustrated in this paper. The aim has been to find work naturally interesting to a boy which embodies scientific or mechanical principles and yet is good from the standpoint of tool exercises involved and simple enough to be done by classes in the ordinary public school. Pehaps I ought to state that for five years there were not more than eighteen in a class though this year there are twenty-four in some. Some of the more rapid workers of almost every class have worked together making articles needed in the regular schoolroom. Cages for animals, doll-houses, looms, window boxes, plant stands, and stools are some of the articles which have been made. One year four boys made for themselves substantial maple benches patterned after those in the manual training room. Home work is continually encouraged.

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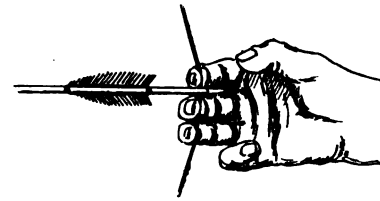
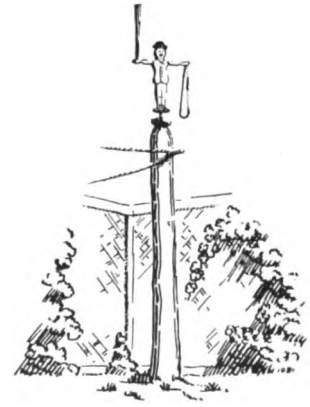
The courses followed are by no means rigid ones, for some models tried one year may be discarded the next year or put into a different grade. The sixth grade course includes an arrow, bow, ring toss, elec-

FIGURE 1



TRUE ARCHER'S GRIP

tric box, "Happy Jack" windmill, waterwheel, and weather cottage. Four feet lengths of straight-grain white ash are used for making bows. This with the arrow forms one of the most popular models, for every boy likes to shoot. The bowstrings are made by the eighth grade boys and are tied with knots shown in Fig. 1. Feathers for the arrows are



supplied by the boys but are cut and split by the teacher, because the bench knife is too heavy for that operation. Rings for the ring toss are made of four or five small willow shoots bound with twine and then covered with strips of bright cloth. As a scientific toy involving the use of that magic force, electricity, the electric box[1] appeals strongly to boys.

[1]See page 247 Manual Training Magazine, Vol. VIII. No. 4; also page 65 Dr. Goetze's "Manual Training Made Serviceable to the School."

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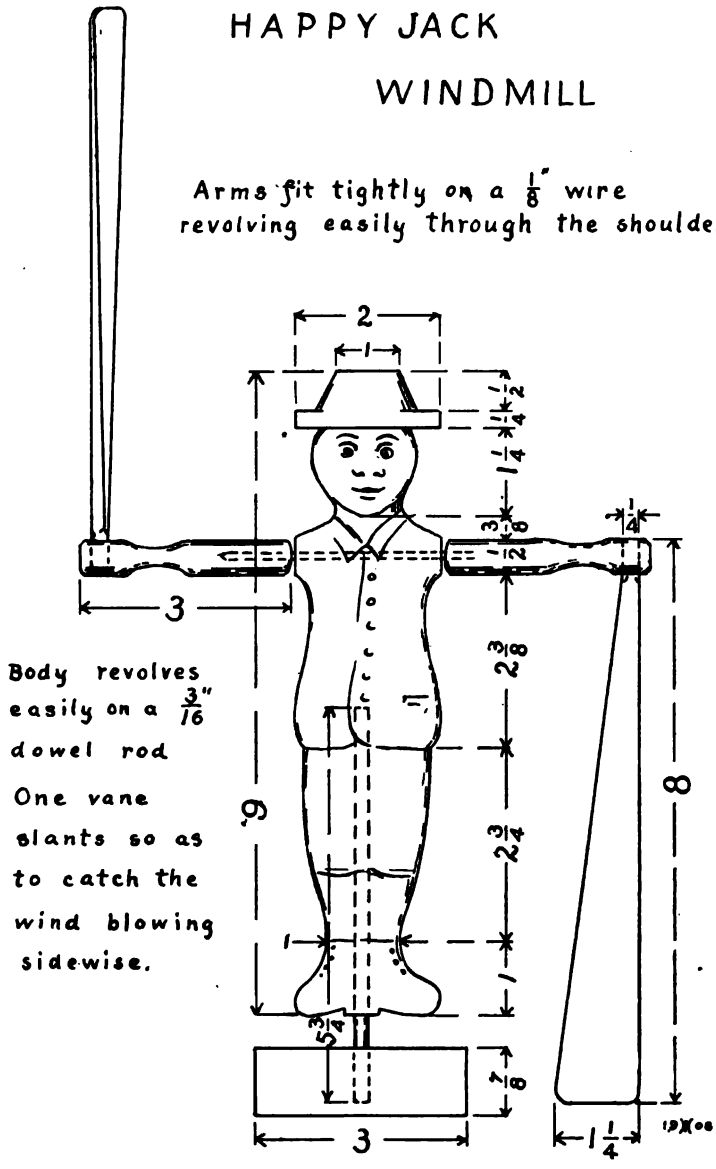

PLATE 1

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The "Happy Jack" windmill, (See Fig. 2 and Plate 1) gaily printed, performing his lively acrobatic feats on the clothesline post on a windy day affords amusement to many others besides the maker. He is mounted on a small dowell rod so as to turn easily. To bore the hole straight for this rod a jig is clamped on the center line of the body; to bore from shoulder to shoulder, the jig is clamped across the body. The

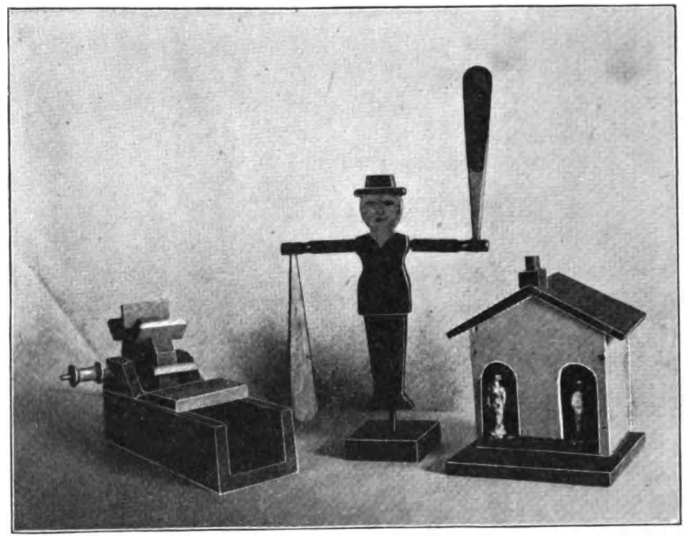

FIGURE 2

two vanes are planed thin at the broad end, and at the small end are fitted tightly into a hole bored through the half-inch dowel rod which serves for arms. They are fastened at different angles to catch the wind from any quarter. The waterwheel (See Fig. 2[1]) is a rather difficult constructive model, but it has been used in this grade for four years. The notches in the wheel are cut out with the back saw. The hole is bored with the aid of a jig. The most difficult operation is nailing the paddles evenly into the notches in the wheel so that when it revolves they do not strike the sides or bottom of the trough. The careful boy has the reward of seeing his wheel revolve freely the first time, while the careless one has to pare down the paddles which strike. The weather cottage, or hygroscope (See Fig. 2[2]), responds to the humidity of the

[1]Also page 185 Manual Training Magazine Vol. VI. No. 3.
[2]Also page 247, Manual Training Magazine, Vol. VIII. No. 4.

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atmosphere, and inasmuch as the humidity usually increases before a storm it serves somewhat as a weather indicator.

For the more rapid workers in all grades extra models are provided. Arrows serve well during the first of the sixth grade, for an archer needs

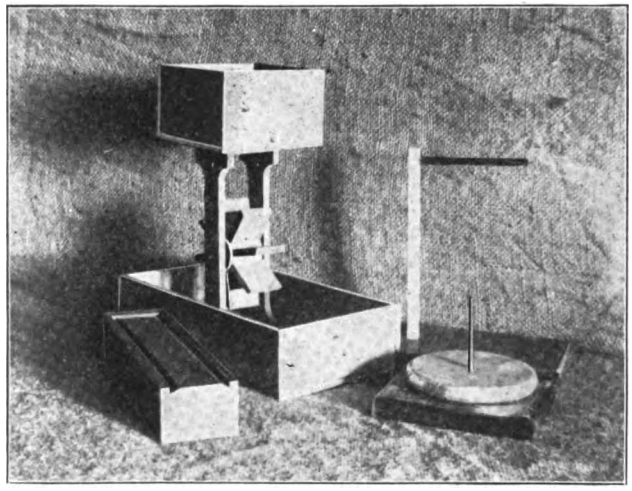

FIGURE 3

more than one arrow. Swords and shields are in good demand whenever the class is reading and perhaps dramatizing the tales of King Arthur.

The first lesson every September is always a drawing lesson and the

FIGURE 4

first model a simple one, so in the seventh grade we begin with a simple knife strop. To make it a thoroughly efficient one a little emery powder is provided to be sprinkled on the leather from time to time. That it is efficient one boy proved by telling how the first time his mother used his for her kitchen knives she cut her finger. The second model is a pencil box, or scholar's companion (See Fig. 3). The bevel on the cover has been a difficult operation for many, and some device

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SAND WHEEL

		LENGTH	WIDTH	THICKNESS
1	BOTTOM	$4\frac{1}{2}$	4	$\frac{1}{4}$
2	SIDES	$4\frac{1}{2}$	$2\frac{1}{2}$	"
2	ENDS	$3\frac{1}{2}$	$2\frac{1}{2}$	"
1	BOTTM	$9\frac{1}{2}$	$5\frac{1}{2}$	"
2	SIDES	$9\frac{1}{2}$	2	"
2	ENDS	5	2	"
2	UPRIGHTS	$7\frac{1}{4}$	2	"
2	END PIECES	$1\frac{3}{4}$	2	"
8	PADDLES	$1\frac{3}{4}$	$1\frac{3}{8}$	"
1	SPOOL	$1\frac{3}{8}$	1 DIAMETER	

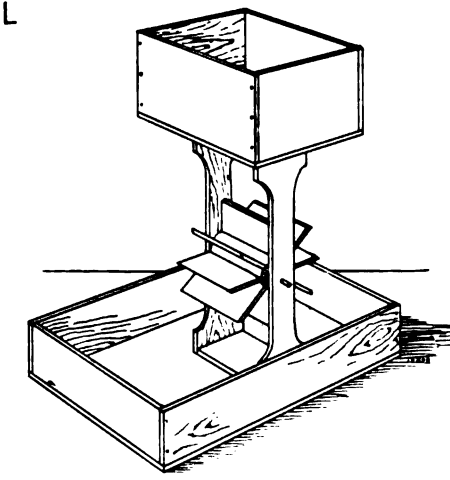

PLATE 2

PILE DRIVER

		LENGTH	WIDTH	THICKNESS
1	Middle Base Piece	9	$3\frac{1}{4}$	$\frac{7}{8}$
2	Side Base Pieces	11	$1\frac{1}{4}$	$\frac{7}{8}$
2	Uprights	15	1	$\frac{1}{2}$
1	Top Cross Piece	$3\frac{1}{4}$	1	$\frac{1}{2}$
2	Runs	15	$\frac{1}{4}$	$\frac{1}{4}$
2	Braces	10	$\frac{3}{4}$	$\frac{1}{2}$
2	Blocks	3	$1\frac{1}{2}$	$\frac{1}{2}$
2	Top Blocks	1	$\frac{1}{2}$	$\frac{1}{2}$
1	Weight	3	$1\frac{3}{4}$	$1\frac{3}{4}$
4	Weight Guides	3	$\frac{3}{4}$	$\frac{1}{4}$

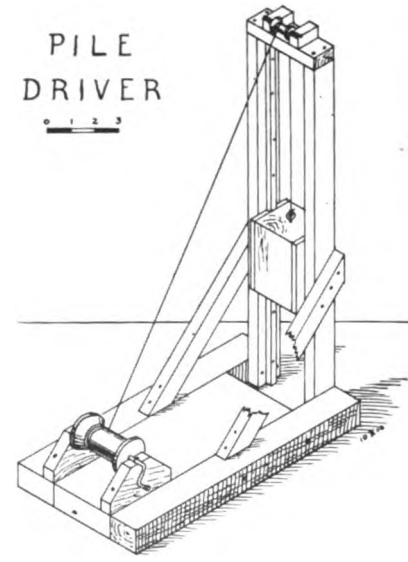

PLATE 3

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BOAT

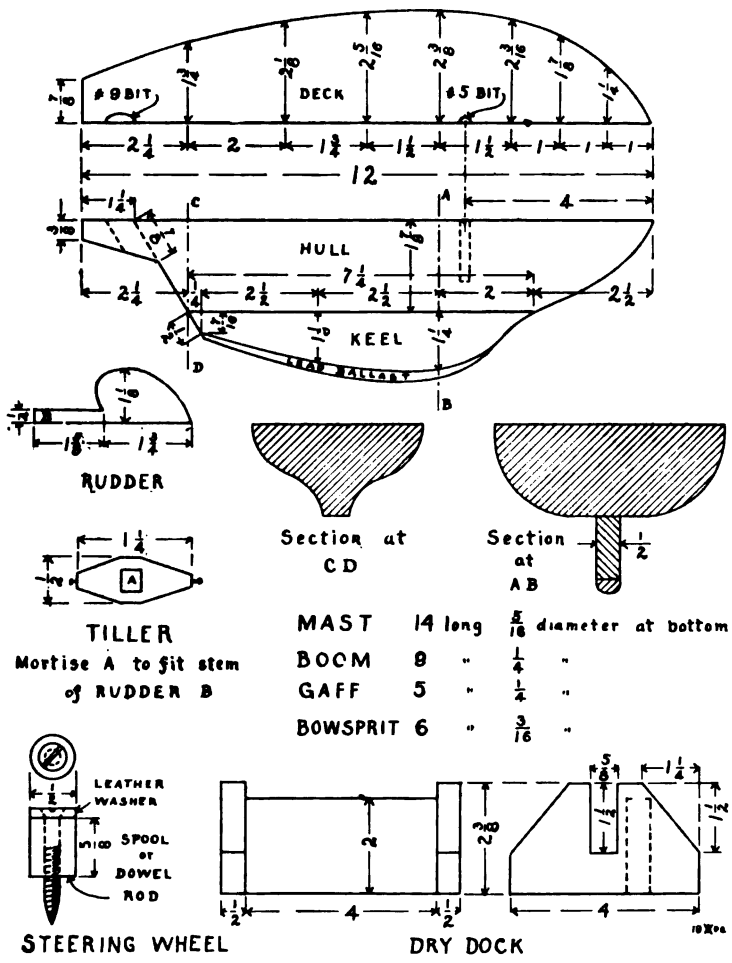

PLATE 4

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may have to be planned to simplify this. The groove has been made with a nail filed somewhat like a chisel and driven through the rabbeted end of a block of wood. (See Fig. 4.) The electrophorous (See Fig. 3[1]) has been used in conjunction with a little pamphlet called "Fun With Electricity," and it offers the boy a good opportunity of learning the fundamental principles of frictional electricity at first hand.

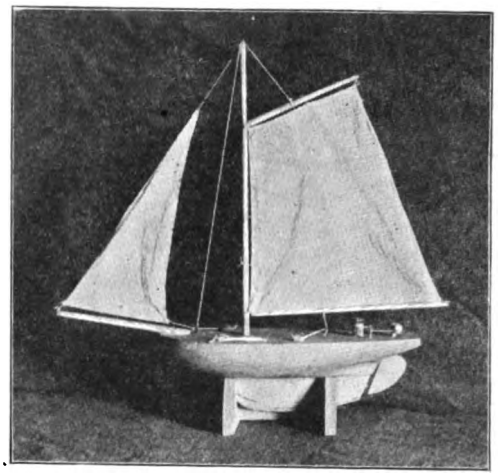

FIGURE 5

Besides the electrophorous proper a simple support (shown behind the electrophorus in Fig. 3) is made to aid in performing some of the experiments. After I had shown a class how to perform an experiment called the miniature telegraph, which requires the sending of an electric impulse from one tin box cover through some three feet of fine insulated wire to another cover called the receiver, one boy said the next day that he had untwisted some wire he found in a picture cord or small cable of short length and twisted the pieces together till he had some twenty feet and made his experiment work through the whole distance. He, by the way, is the boy who made the windmill force pump shown in Fig. 8. The hub of the sand wheel (See Fig. 3 and Plate 2) is the cylindrical portion of a large spool into which eight small holes have been bored by the use of a jig. The pile driver (See Fig. 6) has been a good constructive model in this grade. On a model of this nature

[1]And page 76, Manual Training Magazine, Vol. IX. No. 1; also page 122, Dr. Goetze's "Manual Training Made Serviceable to the School."

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the most successful boys are those who follow the teacher's injunction to finish all parts nicely before nailing any together, except that the runs (See Plate 3) may be nailed to the uprights and the weight guides to the weight. With these exceptions the order of nailing is, first, uprights to side pieces; second, side pieces to middle; third, top to uprights; fourth, braces to uprights and base. The boat (See Fig. 5, and Plate 4) is formed solid of pine with beam and ballast enough to right itself even if the sails do get wet. The rudder is moved by a string wound five or six times around a spool or dowel rod screwed tightly enough to the deck to stay in any position. Some years sails have been furnished by the sewing classes. The elastic gun (See Fig. 6) has appealed to boys who are not burdened with money to spend for toys. I recall one of the other class who bought himself a spring gun for $1.75 about the time the smarter boys had begun to make theirs at school. The rider, which slides in the groove, and the spring, which holds the hook engaging in a screw eye in the rider, have to be made of maple in order to withstand the strain of the elastic. The half spools screwed to each side of the barrel serve to keep the rider from flying off when the gun is discharged.

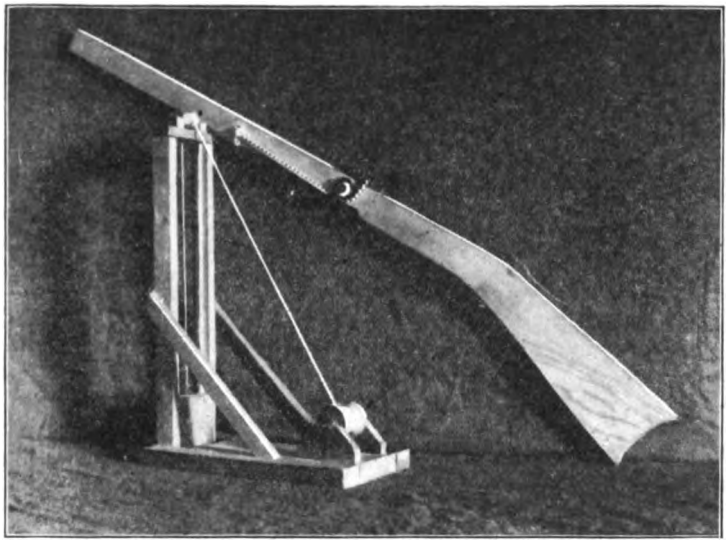

FIGURE 6

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HEAD PIECE					
1	BASE	6	4	¾	¾
1	CROSS PIECE	4	4	¾	¾
1	UPRIGHT	5	4	¾	¾
1	UPRIGHT	5	4	¾	¾
1	BLOCK	2½	2½	1¼	¾ dowel rod
1	CRANK	2½	2½	1¼	¾
1	AXLE	2½	2½	1¼	¾ dowel rod
2	AXLES	2½	2½	1¼	¾
3	WHEELS	1¼ diam.			¾
1	SPOOL, small one for handle				
6	LEATHER WASHERS to go on AXLES each side of wheels				
1	LEATHER BELT	15¼			¾

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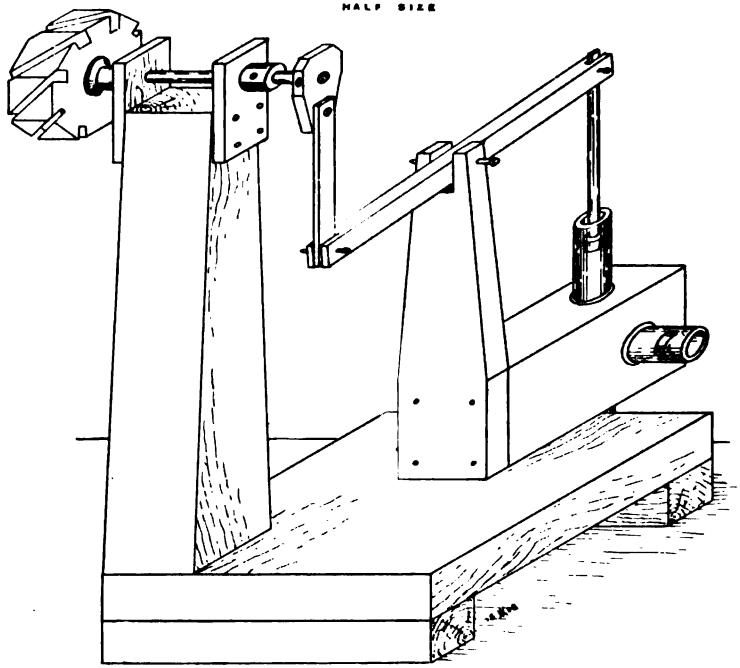
WINDMILL FORCE PUMP

Vanes not shown

0 1 2 3 4

HALF SIZE



No.	PARTS	LENGTH	WIDTH	THICKNESS
1	BASE	$6\frac{1}{2}$	$6\frac{1}{2}$	$\frac{7}{8}$
2	CLEATS	$6\frac{1}{2}$	1	$\frac{7}{8}$
1	POST	9	$1\frac{3}{4}$	$1\frac{3}{4}$
2	JOURNALS	2	1	$\frac{1}{4}$
1	BLOCK	4	2	$1\frac{3}{4}$
1	UPRIGHT	$6\frac{3}{4}$	$1\frac{3}{4}$	$\frac{1}{2}$
1	BEAM	7	$\frac{3}{8}$	$\frac{3}{8}$
1	CONNECTING ROD	$3\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{8}$
1	CRANK	$1\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{4}$
1	WHEEL CENTER	$2\frac{1}{8}$	$2\frac{1}{8}$	$\frac{7}{8}$
8	VANES	$7\frac{1}{2}$		$\frac{1}{8}$
	$1\frac{1}{4}$ wide at one end $1\frac{3}{4}$ " " other end			
1	AXLE	$5\frac{1}{2}$	$\frac{1}{4}$ dowel rod	
1	PISTON ROD	$4\frac{1}{2}$	" "	
3	GLASS TUBES	2		
	$\frac{1}{2}$ inside diameter			
2	LEATHER or RUBBER VALVES to fit inside glass tubes			
3	RUBBER TUBES $\frac{5}{8}$			
	to fit outside glass tubes			
2	Small SPOOLS			

PLATE 6

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Among the eighth grade models the string twisting machine and the windmill force-pump are good constructive models, while the whisk-broom holder[1] offers a good opportunity for decoration in tooled leather. With the string twisting machine (See Fig. 7 and Plate 5) the boys make of soft linen thread the bowstrings required in the sixth grade. To do this threads are strung from hooks on the tail piece to corresponding hooks on the head piece and twisted tightly in the opposite direction to

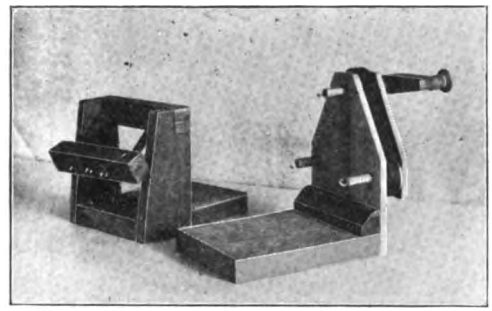

FIGURE 7

their individual twist. As the twisting proceeds the elastic is pulled very taut and when they are twisted enough the strands kink readily if the tail piece is moved nearer the head piece. When this occurs the strands on the two lower hooks are removed to the upper hook and all three twisted together in the opposite direction. The construction of the model is comparatively simple, the greatest care being needed when the shorter upright is screwed to the triangular shaped block, which has first been nailed securely to the longer upright, for unless the three axles are parallel the belt will not run true. The wheels are made by sawing large spools in a mitre box and then rounding their edges a little to crown the face of the pulley, as a mechanic would say. The windmill force-pump (See Fig. 8 and Plate 6) consists of three pieces of thick glass tubing inserted in short pieces of rubber tubing fitting snugly into a wooden block, which has been made impervious to water by pouring hot parafine through it. The leather valves are cemented into two of these glass tubes with sealing wax, and the piston works smoothly in the other one. To utilize this pump for a sort of fire engine some boys connect the discharge tube with a large bottle which serves as an air chamber, from the bottom of which a small glass tube leads through an

[1]See page 243, Manual Training Magazine, Vol. VII. No. 4.

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air tight stopper to a rubber hose with a small glass nozzle. In a strong breeze the pump will send a stream several feet.

This year being the second year of ninth grade work, not many new models have been invented. Last year the boys made small wooden printing presses, but they proved rather tedious for an individual model and it is not being repeated this year. Some boys brought type, and

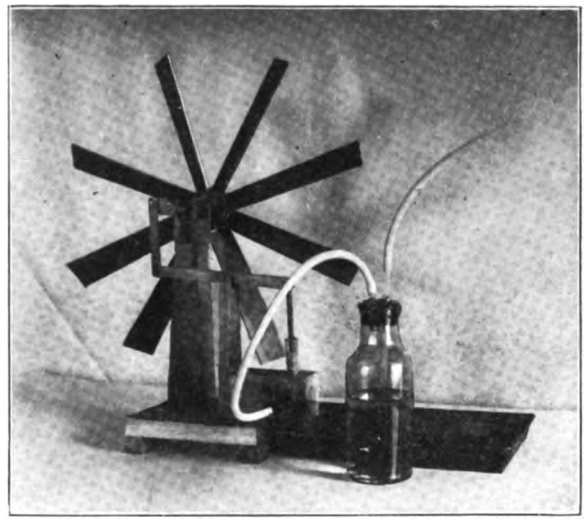

FIGURE 8

some were successful in carving words and simple cuts on maple blocks and printing from them. (See Fig. 9.) At one school, tickets were printed for the class play of The Merchant of Venice. One boy after a class trip to a large publishing plant did a little electrotyping at home.

In all grades some working drawings are made of models or parts of models which the class is ready to construct. At the bench, however, the pupil uses hektograph drawings made by the teacher. These drawings, as the reader may have discovered from the various plates, are not always complete working drawings for the reason that sometimes unessential dimensions can be supplied by the pupil's own judgment and at other times explanatory sketches must needs be put on the blackboard. Complete detailed drawings could not be interpreted by the pupil unaided, hence the aim at simplicity. In general drawing is looked upon as an interruption of the more interesting bench work.

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The results of such work as has been suggested above, through a period of more than five years, have been so favorable that, when I recall the more formal models used in many schools and in my own in earlier years, I confess some astonishment that they can furnish any interest or incentive to a boy. But I suppose it is something like the problem of existence,—if the growing organism cannot get the food best suited to its growth, it manages to subsist for a longer or shorter time on inferior food. Then, too, the mere chance to handle tools and shape material is of considerable interest to most boys, and an enthusiastic teacher can arouse interest in almost any subject. But our problem as manual training teachers is to find models which are rich in interest to boy life, and which touch in as many points as possible the larger life of the world into which he is growing. If the work appeals to him as something worth doing he will put into it his best thought and effort.

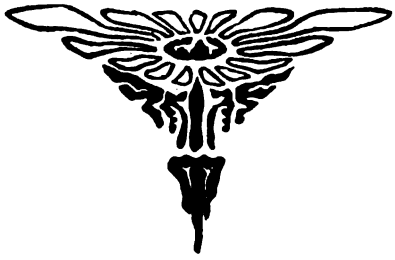

FIGURE 9.

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THE ORGANIZATION OF MANUAL TRAINING IN THE HIGH SCHOOL—IV.

GILBERT B. MORRISON.

IN THE tables accompanying the foregoing articles and in those in the present one concluding the series, one dominant characteristic of our work is conspicuous, *viz.*, that each exercise shown in the first column has for its prime object the mastery of a mechanical process through which the student becomes familiar with the elements underlying the best shop practice; for example in making a mortise and tennon there is a method of procedure in measuring, laying out, sawing and chiseling which has been evolved with long practice by practical workmen. In the broad application of the mortise and tennon in the manufacture of sash doors, furniture, framing, bridge work, etc., the ability to execute this process in a workmanlike manner is, of course, a prime essential to the boy who will later work at any trade in which this process is employed. It is to the trade what the alphabet is to a piece of literary composition. And so it is with other exercises.

These processes are fundamental and paramount, and for the boy who will enter any woodworking trade, they are indispensable. To the average boy in the manual training shop an additional value attaches to the exercise when the process is applied in the construction of some useful article, a table or other piece of furniture. Still further is its educational value enhanced when attention is given to the design of the piece. These additional elements arouse interest, quicken the perceptions in the discovery of proper relations, and cultivate the taste in conceiving harmony of line and form.

It is in these latter elements that the manual training of today is superior to that of yesterday when the work of the school shops was confined to the processes alone. But it should not be forgotten that for the purposes of merely learning a trade which consists in the main of the constant repetition and application of a few processes on the part of the man whose work is limited and circumscribed by the requirements of the large contractor or manufacturer these fundamental processes are the *sine qua non* for the boy who by reason of financial or mental limitations will be consigned to the unvarying routine of the workshop.

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It is right here at this period in the evolution of public education, at the dawn of the demand for industrial schools that the significance of our contention for the shop exercise becomes clear and conclusive. Some of us have tenaciously held to the necessity of rigidly holding the work of the school shop to those processes and principles which underly a large number of trades so that this work will command the respect of the industrial world—so that it will at once be recognized by the practical mechanic as good training as far as it goes.

The demand for boys who have had this training in our best manual training schools is sufficient evidence that it is of the right sort. Every principal and director of such a school could give scores of instances of applications for boys to take places in which mechanical skill is required. It was only yesterday (Jan. 14) that the father of a boy in the senior class of the McKinley High School was telling me of the value this shop training had been to his son. For two summers past this boy has been doing carpenter work for a well known contractor and builder. The father took special delight in telling that the boy was often called by the foreman to that part of the job which required special initiative, and mentioned stair building as an instance. The father is a college bred man, and he declared he had become a convert to manual training against his will, through the influence it had exerted in the life of his boy.

The educational value of this training to the boy who will never work at a trade has been pointed out so often, has been discussed at such length, and has received such universal assent that further reference to it would be unnecessary were it not for the relation this phase of the question bears to the general consideration of industrial education at public expense.

It will be distinctly remembered that when this training was first introduced into the high schools of this country its advocates were very particular in disclaiming any intention of making it vocational or special in its aims. It was introduced on the broad grounds of culture and to the end of an all around development, and because of the changing conditions of a scientific and industrial age that made this good material out of which to modernize the high school curriculum. Our boys no longer possessed those natural advantages of country life which had been formerly enjoyed by boys of an earlier period, and it became imperative to supplement the academic school by some of the realities of material experience. It goes without saying that all these purposes have been more than realized in our manual training high schools.

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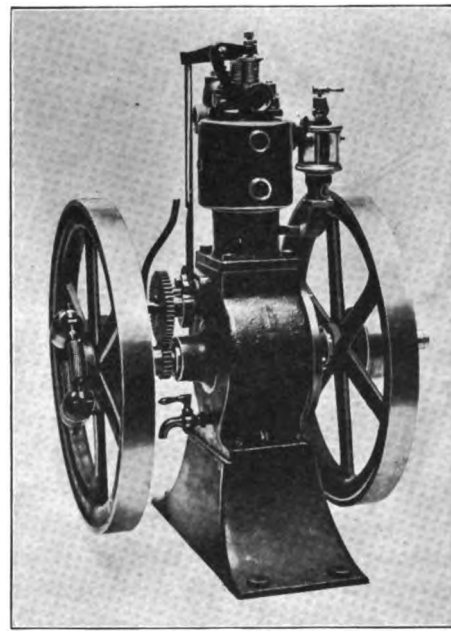
Pupils and their parents are electing this course regardless of any conscious choice of a future occupation. So universal is the recognition of the general value of this training that colleges are accepting it for admission on a par with conventional branches. When manual training was first introduced into the public schools we had not considered



ONE H.P. GASOLINE ENGINE MADE BY DELBERT WENZLICK, A PUPIL IN THE Mc KINLEY HIGH SCHOOL.

the necessity of trade education *per se*. At that time no subject could have been introduced which had not proved its right to a place in the curriculum on general educational grounds. Manual training made this claim, and has made good.

It is now becoming evident from the wide spread discussion of industrial education from many sources that this country is looking to it for other purposes than that of general education. Associations for the promotion of industrial education have been formed. Complaints that the public schools are still too medieval in their methods are heard from certain quarters. Many schools are making their appearance:—

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"Trade Schools," "Technical Schools," "Foundations," "Arts and Crafts Schools," "Industrial Schools," "Textile Schools," "Poor Boys' Schools," "Manual Labor Schools," "Grade School Manual Training Schools," "Manual Training High Schools," etc., etc., are being built by enthusiastic millionaires. These schools represent an endless variety of types each revealing the point of view of its founder. Some claim that a school to have any value should be fully equipped for technical instruction; others that technical training is worse than useless. A certain class holds that all book learning should be limited strictly to what a boy needs in the shop. Another class that theory and practice should go hand in hand. A few still believe that no manual training in school is essential, even for those who will follow mechanical pursuits, holding that the humanities "make men," and that a man will pick up his trade when he needs it. But the belief that manual training in some form has come to be an essential in public education is becoming almost universal.

Now, in each of these views there should be a grain of truth common to all the rest. We should be able, if we can discern this common element, to get a perspective view enabling us to foresee the relation of industrial education to the high school of the future. It seems to me that this element is not difficult to find and that it may be expressed in very simple terms. I believe it might read something like this:—*Every American boy is entitled to all the learning he is capable of taking. This learning should be both mental and manual and should be made as practical as possible.* In other words he should, to the extent of his ability, come to his own in the heritage of the theoretical knowledge of the race in so far as he can by training be taught to embody this knowledge in purposeful practice.

This conception of the problem calls for great breadth and flexibility in our schools and in our curriculums. If we are to make it possible for every boy to receive his birthright, the flexibility and versatility of our schools must be commensurate with the endless diversity of talent and opportunity. The boy who can go no farther than the eight elementary grades should have along with his three R's all the manual training of the practical sort that can be worked into a well balanced curriculum. If the limitations placed upon him by poverty or a paucity of natural endowments condition him to a life of manual labor then that labor should be made as skillful as possible; for this reason manual training of the plainest sort should be offered through the grades. It should consist of those simple fundamental processes

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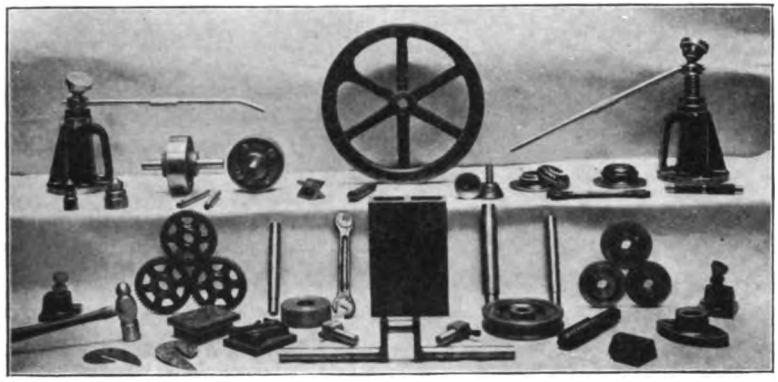
which underlie the mechanical trades and should so far as time and the powers of the pupils will permit be carried forward in the artistic spirit. So far as it goes it should be in the direction of community industry. Differences in talent should be recognized from the start and each boy's work adapted to his powers. If he is dull in books



SOME SHOP EXERCISES IN THE Mc KINLEY HIGH SCHOOL.

and unable to keep up with his class let him do what he can and give him more of the manual training. If he shows no promise of skill in the use of tools give him less manual training and more books. Find the boy and then proceed to build upon him; and in dealing with him keep close to the border line between what he knows and what he does not know—between what he can do and what he can not do. It is the discovery of this line and constantly keeping it in view that constitutes good teaching. Boys treated in this manner through the elementary schools will be able to earn an honest living in factory, shop, counting house or department store. But it is at this point that we must guard our schools and our youth against the fallacies of that class of millionaire philanthropists who would make this imperfect and premature development the ideal for all boys instead of simply regarding it as an aid to those who by limitations of natural endowment or poverty must go through life on short allowance. It is even admitted in advertisements under the guise of education through that overt, unguarded conceit which often envelops men of great wealth that boys thus limited in education may even make millionaires—*not often indeed of themselves but of those shrewder men who employ and exploit*

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them. It may be noted here that men of such elementary education are especially attractive to the large manufacturer. They can run a lathe and receive their daily wage without bothering their large employer with disturbing ideas of their own. They have no vaulting ambition to go into the manufacturing business on their own account. This proves to the large manufacturer that they have all the education they need. Men of this kind of training have made him rich, and is not this sufficient proof of adequacy?

Men who have thus grown rich by the exploitation of this kind of service sometimes get philanthropic, and build schools for the purpose of propagating this elementary training. This is most excellent when the ostensible purpose is to provide a training for those boys who will go to work before reaching the high school. But what shall we say of the donor who discredits all higher education? What estimate shall we place on the gift of a man who through the influence of wealth and published articles makes his elementary school a bar to further advancement? How many of such elementary schools would be required to do good enough to outweigh the evil of a doctrine which, while providing for the children of poverty and mediocrity would consign all children to that same class?—a doctrine that would head off all boys, whatever their capabilities may be, from a technical education or from the broad highway of human knowledge? "Predatory wealth" will indeed reach the climax of its audacity when it can stand at the portals of higher education and proclaim that the highest aim in life is a money bag and that the shortest and surest way to it is through the shunt of comparative ignorance!

But it will have to be admitted that our technical schools are themselves partly to blame for the criticisms which are being made upon them. Theory without practice is of little value and young men sent out with a head full of formulas which they can not apply, often bring technical education into disrepute. With every advance in theoretical knowledge there should be a corresponding advance in the common every-day applications of laws and formulas. Young men taking a technical course should have constant practice in the shop and be required to work out those practical problems in measurements and installations. A man thus educated will far outstrip the one whose knowledge and skill is obtained solely in practice by empirical methods. In addition to this it may be said for higher technical education as well as of higher education in general that it is not all of life to work and to prepare for economic efficiency. The stature of a man is not to be

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measured in foot-pounds or in amperes. The growing mind and the expanding soul made possible only by the power to read and to appropriate the intellectual achievements of the race are essential to complete living and to the fullest realization of man's best self. We will accept with thankful hearts the manual training which the millionaire

SCREW JACK, AN EXERCISE IN THE MC KINLEY HIGH SCHOOL.

manufacturer gives to the elementary school—a training which benefits the boy who can not reach the high school, but in this acceptance we must antidote any poison which may be lurking in it for the boy who can.

When the boy who by reason of ability and opportunity reaches the high school the essential nature of the process well begun in the grades should not change. It is still a process of keeping to the border line between what he can do and what he can not do, still a process of proper selection and adaptation. This adaptation will be made possible through intelligent differentiation. Fortunately this differentiation will not mean revolution. It will only mean a careful study of the past development of our schools, and of the present demands. The suggestion of the introduction of the industrial or trade school idea into

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our high school is not new if we consider the question from a generic point of view. Ever since the establishment of public high schools in this country about seventy years ago they have been undergoing change and this change has always been one of differentiation and specialization of function. Even the names which have been given to different groups of studies called "courses" indicate clearly enough that these groups from which pupils of different bent may choose are intended for different purposes, and these purposes are economic. Latin and Greek were at first placed in the curriculum because they were supposed to fit students for service in the learned professions. Science was introduced to meet the demands of an era of scientific activity and invention. The Commercial studies, typewriting, bookkeeping, stenography and office routine were added to the curriculum in answer to the demands of trade and commerce.

With the growth of large cities came manual training to supply the motor activity which the absence of country life had deprived our boys, and to counteract the one-sided influences of an education exclusively bookish. These facts in the history of secondary education furnish but one answer to the question as to whether the demand for industrial education should be met in the high school. It remains only to ascertain just what shall be the nature of this the next differentiation. In reality the problem is not so difficult as it appears, inasmuch as the manual training already in our best high schools furnishes the kind of training needed—a training which certainly contains the underlying principles of many industries. We have only to add to the courses we now have by including more of those processes employed in the various trades. The selection of these processes will have to be carefully made with the assistance of practical men representative of the industrial community. Along with these additions there should come a greater latitude and flexibility in making out individual programs for pupils of varying ability and inclination—a flexibility ranging between programs almost wholly academic to those almost exclusively manual. All studies and exercises should be elective in the sense that principals and directors may give each individual boy what he needs and what he is able to receive regardless of traditional standards. We must adjust our schools to the principle that it is just as necessary and legitimate to help a boy to a trade as it is to help him to a profession—that training for citizenship is putting each and every boy at his best, and keeping him there as long as practicable.

The highest and best type of secondary school is cosmopolitan, and

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contains under one head all branches which have proved their right to a place in high school curricula. The new differentiation which will sooner or later be made that will provide a certain amount of training for industrial ends will probably take place as others have done, and become an incorporate part of the school which will continue to retain its cosmopolitan character still preserving a perfect social unity and equality between all classes of children regardless of the composition of their individual programs. That the problem of industrial education will be worked out in the high school seems certain; first, from the observed tendencies of the past to differentiate the work and to add to the curriculum in conformity to changing conditions; second, that the age of the pupils just passing from childhood to manhood is most favorable to it,—an age most suitable for those bodily exercises requiring dexterity and strength; and third, that the work is already begun in the well chosen processes and exercises as now carried forward in finely equipped shops. The gradual addition of more shops, more equipment, more processes; and the granting of a larger flexibility in the choice of work should solve the problem.

Turning, in conclusion to the fourth year work in the machine shop, a glance at the tables will show that it serves equally well for general educational purposes and for preparation for a trade. In former articles attention has been called to the individual character of the work in the joinery and forge shops, and to the co-operative nature of the work in the turning shop. In the machine shop the work while possessing many of the merits of the other shops introduces still another quality, that of *supervision*.

The educational value of the work in this shop is often underestimated in the claim that it is the machine and not the boy that does the work. This claim will not stand; for while it is true that the machine does the work it is the boy who puts the machine to work and who must see that it does its duty. This implies an understanding of the construction and operation of the machine, an appreciation of the power that drives it, and a careful adjustment of all its parts. It presupposes an intelligent, cool and thoughtful mental attitude. It is here that thought must preced action, else an expensive accident will be sure to happen. The machine is to be made the boy's servant; but it is a servant requiring the most careful direction and the most constant and intelligent supervision. This servant under guidance is faithful in the exact performance of its work, but it can not be trusted out of sight of its master. It is a servant that goes on a strike when the

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TABLE IX.—BENCH AND VISE WORK.—FOURTH YEAR.

Quarter	Process	Application	Exercises Illustrating the Process
1st	1. Lectures and Notes on Equipment, Shop Ethics, Small Tools, Etc.	General.	Character of Instruction, Shop Ethics, Care of Self, Care of Tools, Shop Equipment, Tool Room Keeping and Regulations, Measuring and Small Tools.
	2. Lectures and Notes on Materials, Shop Processes.	General.	Metallurgy of Iron and Steel, Alloys, Bronzes, Brasses, Bearing Alloys, Screw and Pin Data, Shop Processes and Kinks.
	3. Laying Out.	Laying out Rectilinear, Cylindrical and Drill Work.	Angle Block Wrench, Bench Block, "V" Block, Surface Plate, Center Square, etc.
	4. Hammering and Peening.	Riveting, Chipping, Stretching Metal.	Angle Block, Rivet Joint.
	5. Power and Hack Sawing.	General.	Cutting Stock, Center Square, Calipers.
	6. Chipping.	Cutting Sprues, Fins, Irregularities and Rough Spots on Castings, Keyways and Keyseats.	Angle Block, Smoothing Castings.
	7. Filing.	Removing Tool Marks Die Work, Small Intricate Surface Finishing. Fitting.	Angle Block, Wrench and the Majority of the Exercises.
	8. Drilling and Reaming.	Bolt and all kinds of small holes, Fitting.	Angle Block, "V" Block, Calipers, Hammer, Center Square, Planer Pin, "T" Slot Pin, Flange Coupling. Jack Face Plate, Boring Bar, Drill Vise.
	9. Threading and Tapping.	Use of Dies in Threading, Aligning Taps, Tapping.	Angle Block, Calipers, Planer Pin, "T" Slot Pin, Flange Coupling.
	10. Fitting and Finishing.	Assembling Machinery and Machine Parts.	All Exercises.
	11. Key Fitting and Broaching.	Keyways and Keyseats, Splines, Cutting Irregular Shaped Holes.	Flange Coupling.
	12. Scraping.	Surface Plates, Ways, Guides, Housing Faces, Bearings.	Surface Plate Ways, Gauges.

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TABLE X.—MACHINE TOOL WORK.—FOURTH YEAR.

Quarter	Process	Application	Exercises Illustrating the Process
	1. Lectures and Notes on Machine Tools, Shop Equipment and Processes.	General.	Carefulness in the Shop. Machine Tool Equipment. Care of Machines, Friction, Lubricants and Lubrication. Cutting Tools, Miscellaneous Machine Tools and Accessories.
	2. Lectures and Notes on Mechanics, Devices etc.	General.	Mechanics, Power Generating Machines, Elementary Electricity, Power Transmission, Motor Drives, etc.
	3. Straight and Taper Turning.	The great bulk of Cylindrical Work.	Arbor, Boring Bar, Sheave, Flange, Coupling.
2d	4. Screw Cutting.	All Accurate Threading with the Lathe.	Planer Jack, Ink Bottle Holder, Face Plate, Jack Screw.
	5. Boring.	Annular Interior or Surfaces, generally larger than 1 inch in diameter.	Sheave, Flange Coupling, Planer Jack, Ink Bottle, Holder, etc.
	6. Drilling.	Small Holes for Bolts etc.	Angle Block, Boring Bar, Flange Coupling. Face Plate.
	7. Grinding.	Sharpening Tools, Rapid, Accurate Production of Cylindrical and other Work. Gages.	Tool Grinding, Arbor, Drill, Reamer Tap.
	8. Planing.	Plane Surfaces, Large and Small. Planer and Shaper Work.	Bench Block, Surface Plate, "V" Blocks or Drill, Drill Vise, Hammer.
3d	9. Milling.	Accurate Work for Small Tools, Parts, Cutters, etc. Any Geometrical Surface.	Gear Rack, Drill Vise, Drill Tap.
	10. Tool Making.	Tool Room Work, Repairing Small Tools, Making Jigs, Cutters, Dies, etc.	Cutters for Boring Bars, Center Square, Drill Vise, Tap Drill.
4th	11. Small Machine Construction.	General Small Shop Practice.	Class Project Work such as Engines, Tools, Generators, Machines, Etc.

master becomes careless and inattentive. Therefore the supervision required in the machine shop is of the highest educational value. It is here that any lack of mental and physical co-ordination in a boy's constitution is sure to be exposed. In the machine shop as in other shops the work is individual, and each boy is encouraged to do all he can in

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TABLE XI.—DRAWING.—FOURTH YEAR.

Quarter	Process	Application	Exercises Illustrating the Process	Form of Design applicable to Process and Exercise
1st	1. Free-hand, detail and Assembly Sketches of Machines.	Mechanical Work as done in Practice.	Free-hand Detail and Assembly Sketches of Steam Pump, Speed Lathe, Drill Press, etc.	
2d	2. Working Drawings of Machines from sketches.	Mechanical Work as done in Practice.	Working Drawings from Sketches already made of Steam Pump; etc.	
3d	3. †Architectural Lettering.	Architectural Drawing.	Sheet on Architectural Lettering.	
4th	4. Architectural Rendering, and Classic Orders.	Architectural Constructions.	Details of Walls, Arches, Mantles, Stairs, Doors, Windows, Cornice Porch, Ornaments, Classic Orders.	
Extra	5. *Elementary Principles of Machine or Architectural Design.	Design in General.	House, Bridge, Lathe, Engines, Turbines, Dynamo Motors, etc.	Constructive, Form and Decorative.

NOTE:—These are interchanged at discretion of teacher in charge.

*NOTE:—Are given when time permits, as an elective.

†NOTE:—Special courses are given in Machine Drawing and in Architectural Drawing beginning with the Third Year upon request of pupils of exceptional abili··.

the time allotted, but quality rather than quantity is the chief concern. There is a great difference in the amount of work done by different boys. Some do not go beyond a few of the simplest exercises while others go far beyond the exercises usually prescribed. As an illustration of this, a gasoline engine, shown in the frontispiece, was begun and finished within the present school year by Delbert Wenzlick a pupil in the McKinley High School.

The practical and industrial character of the work of the machine shop as well as that of the forge shop is evident, and is generally admitted. A glance over the processes is sufficient to show that they are those commonly employed in every commercial machine shop. A

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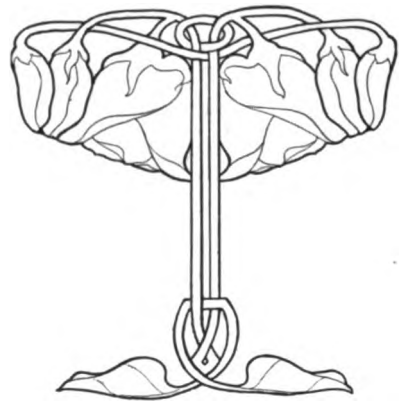
sufficient proof of the industrial efficiency of this work is found in the fact that boys who have taken a full course in our best high schools are sought for places in commercial shops, and it has often been observed that they often rank above men who have served several years as apprentices or assistants. Although the machine shop was not primarily placed in the high school to turn out machinists, it is quite competent to do so whenever the demand for industrial education reaches that stage.



DRAWN BY MORRIS GREENBERG.

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A COURSE OF STUDY IN MANUAL TRAINING—III.[1]

CHESHIRE LOWTON BOONE.

THE sandtable projects outlined in the second paper are typical of the whole class. This form of representation, involving much valuable hand work, can be carried a great deal farther than has been so far indicated. To illustrate a somewhat advanced form of paper construction for representation purposes, two plates are appended to the present paper. These plates give the details of construction of an engine, tender, coach, freight car, station, etc., to be used in the depiction, on the sandtable, of a railway station with additional surroundings, as a freight house, round house, cabs, trucks, express wagon, street crossing, etc. This is suitable work for the average third grade.

ISOLATED EXERCISES.

It was stated in a former number of the Manual Training Magazine,[2] that every course of study, no matter how compact and well articulated, must necessarily contain constructive problems for special purposes or occasions; as valentines, Christmas gifts, cards, calendars, boxes, etc., covers for school work, desk pads, portfolios and others for definite reasons. All exercises, dealing with such material, are legitimate, being the result of some immediate and utilitarian desire. These things should be made only at an appropriate time, *when they are needed.*

The problems will, for convenience, be grouped into three classes.

a. Folders, invitations, calendars, mounted pictures, Christmas cards, valentines, frames, post cards.

b. Boxes (candy), envelopes, baskets, ornaments for the Christmas tree.

c. Portfolios, desk pads, and the simple forms of book-making.

To make this phase of constructive work profitable, one must not only choose an opportune occasion for employing it, but the method of construction must be absolutely within the abilities of the children, and adequate. Most of the articles suggested above are, in common practice, decorated—to suffocation! And very badly lettered, although it is the province of the drawing teacher to handle design and lettering. A word will be said about them later.

[1]Copyright, 1907. Cheshire L. Boone.

[2]April, 1907, Volume VIII, No. 3, pp. 140-147.

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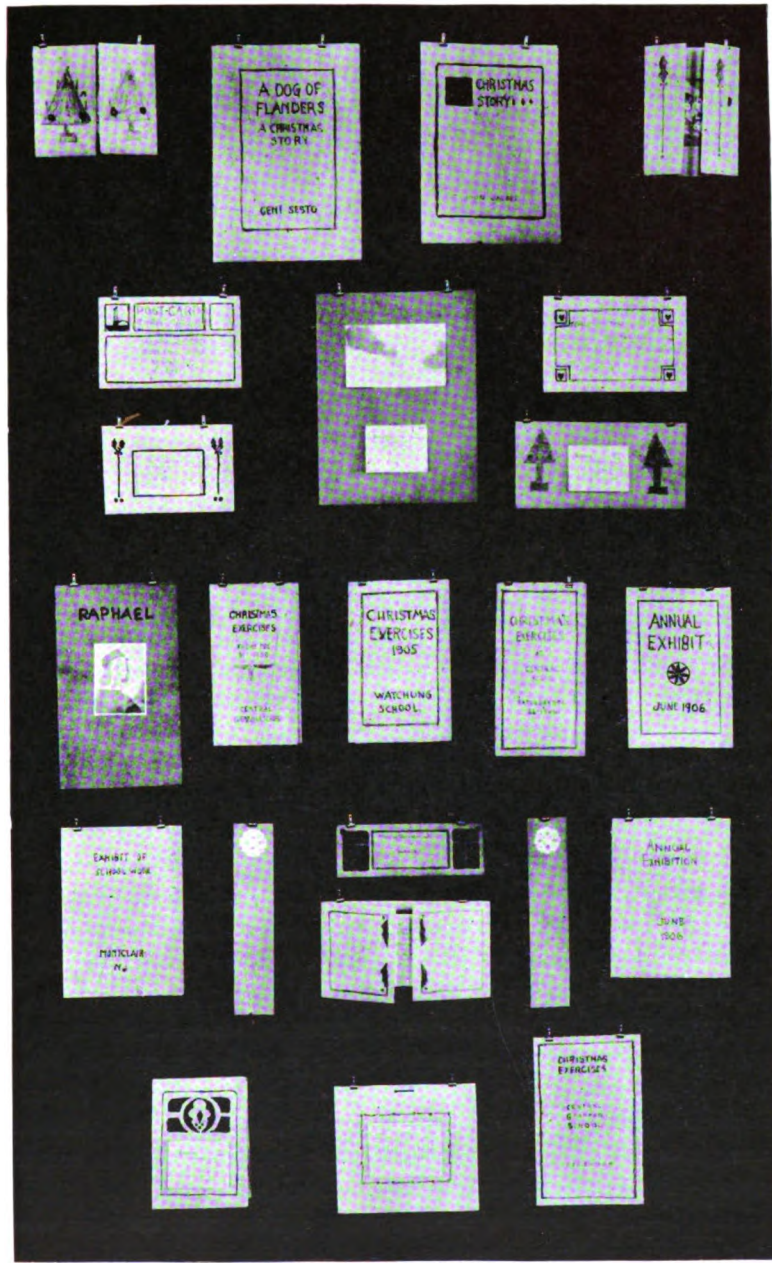
A DOG OF FLANDERS
A CHRISTMAS STORY
GENE SESTO
CHRISTMAS STORY
RAPHAEL
CHRISTMAS EXERCISES
CHRISTMAS EXERCISES 1905
WATCHUNG SCHOOL
ANNUAL EXHIBIT
JUNE 1906
ANNUAL EXHIBITION
CHRISTMAS EXERCISES

PLATE I

Group a—The plate (I) shows a selected number of problems. These are made of cover paper of good tone. First and second grade children can use the ruler but crudely, so these folders are really folders. Paper of proper size is given the class. If the article is to be a calendar, or mounted picture, a templet of cardboard, or the two-inch tablets of the kindergarten, are used for tracing the square, oblong or circle to contain the calendar pad, or picture. Sometimes this outline is done in color. Whatever decoration is used, may be done in crayon and should be very severe, formal and sparing. Formal decoration is strongly advocated: It makes better work and a higher average of work. Third, fourth and fifth grades can elaborate their exercises of this group considerably, both in construction and design. They can measure for any desired number of folds: they should be able to use lettering easily; and they can use simple borders and stamps for decoration. The plate shows typical examples, copied from school work executed within a year. Gothic letters, all capitals should be used, and executed preferably with crayon. Grammar grade work along this line is more a question of design than handwork, and need not be discussed here save for certain aspects of the Christmas problem.

Christmas gifts, cards, boxes, etc., are ever with us and in the midst of such a wealth of interesting, familiar subject matter, one would naturally expect to see charming school work. In reality, the holiday results, are usually atrocious, maudlin, sentimental attempts to produce a "pretty thing." The trouble and remedy are to be found again in design. The problems should be more simple, more restricted and the children limited in their desires. The limitation can be enforced without the slghtest trouble. Children are easily swayed and learn with ease the advantage of an orderly design over one without reason or meaning. One suggests and uses simple, direct ornamentation as one would simple, direct English, and for similar reasons. In every case, the teacher sees to it that, in the preliminary discussion of the problem, the work is narrowed to two or three forms of decoration. The pupils may have their own way as to details, but the general form of the problem is settled to begin with. This same principle holds true with the purely constructive side of the problems, as in box making. The method of making a box is given: the pupil can make the proportions to suit her purposes—for a handkerchief, collar, tie, sash, card, etc.

Group b—Aside from utilitarian reasons, this group contains many choice exercises in three dimensional handwork, which is good training. The early exercises of past years, in making geometrical solids, were of

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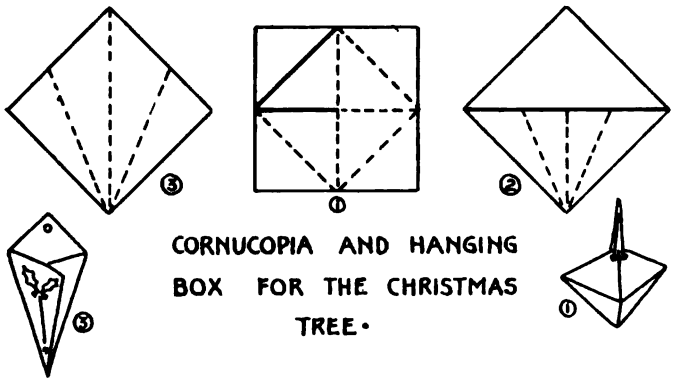
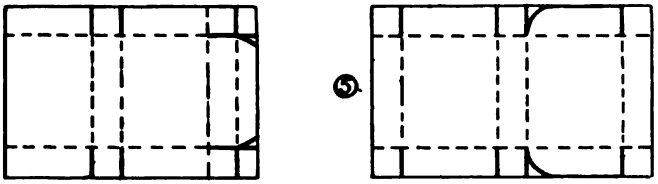
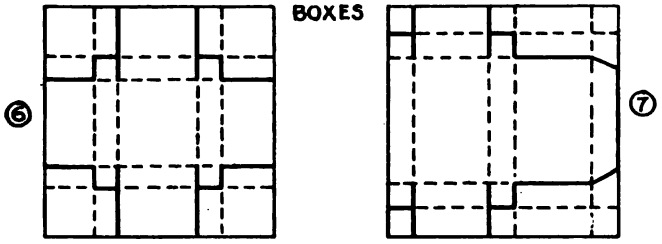


CORNUCOPIA AND HANGING BOX FOR THE CHRISTMAS TREE.



CANDY BOX ④ AND GIFT BOX ⑤
THESE CAN BE ENLARGED TO ANY SIZE IF RELATIVE MEASUREMENTS ARE RRESERVED.

BOXES



BOX ⑥ IS A USEFUL CONSTRUCTION.. IT CAN BE VARIED IN SIZE & SHAPE.

PLATE II

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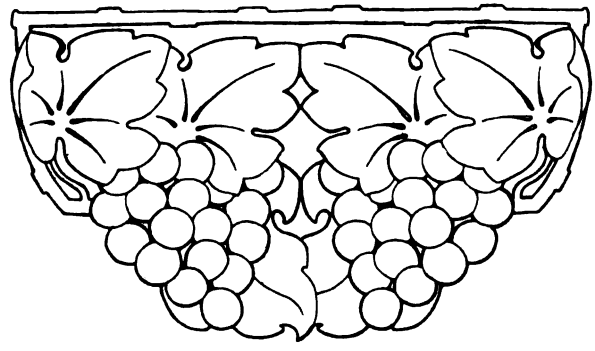
the same type, but no one cares for solids: why should one? The cornucopia, basket and pointed box for the Christmas tree are fine things for the primary grades, one and two. For the other years, a series of boxes is shown (Plate II) one or more of which will be found suitable for any ordinary purpose. Box-making is a craft that is worth studying. The usual box suggested for school work is made from a pattern about which, the child is supposed to trace, and then fold up the tracing—a pernicious, slovenly practice. It is inaccurate and has no value whatever as an exercise. The boxes here given are designed as are the commercial article. The plans are elastic and in most cases (notably No. 7) admit of extension to any desired proportions. Moreover there are boxes here which will shut up tightly and stay closed.

These boxes should be made of heavy cover paper or tag. The plan is laid down by measurement, the cuts made, and the folds lightly creased with the point of the scissor blade. The crease may be folded either in or out.



DRAWN BY M. LANGSTROTH

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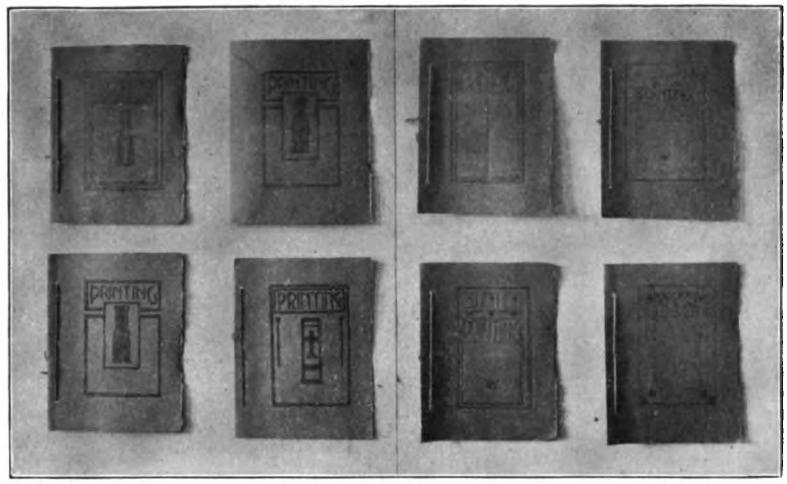

THE STUDY OF PRINTING.

MICHAEL W. MURRAY.

WE have heard much about the correlation of school subjects, and in theory, it is the proper thing to do, but when we come to the actual teaching of them, especially in departmental schools, we are likely to find that each teacher is presenting her own subject with little regard to what the others are doing; or if correlation is tried, especially that of an academic subject with one like manual training, the later work is too often subordinated and "made serviceable" to the former.

The accompanying pictures show the material results of a piece of correlated work which was done in connection with the study of the printing industry, in which equally important parts were done in the manual training, drawing, and academic departments. The subject was studied by four different classes under the ordinary city school conditions, where we have about twenty-four boys in the manual training classes, the same or a larger number in the drawing room, and from forty to fifty in the regular classes.

The history, invention, and the effect of printing on civilization were studied by the pupils under the direction of the class teachers. In this connection, some of the best possible work in history, geography, spelling, grammar, composition and penmanship was done, and we might well

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have included arithmetic if time had permitted. The pupils were told that their compositions were to be made worthy of preservation in book form, which meant that several problems were to be solved. In the drawing department, the best color for the cover, and a cover design of the right size and appropriate motive were worked out.

The work in manual training included the study of the mechanical part of the printing press, the movements which make pressure, the evolution of the printing press and modern methods of printing. The accompanying simple presses were designed and made as group projects, while each boy planed a block of wood on which the design made in the drawing room was cut. The building of the press was work of a heavy and correspondingly rough character, while the blocks had to be made with the greatest care and accuracy to be absolutely flat and true and just the right thickness to make them "type high." Before the blocks were cut the designs were traced from the original on transparent paper, and retraced in the reverse on the wood so that they would reproduce properly when we came to print from them. The blocks were then ready to cut. This was done by first outlining the design with a very sharp veining tool, and then cutting away the background with a flat gouge or chisel. The only difficulty encountered was the outlining across the grain, and that might have been overcome by cutting first with a sharp knife. At first, we thought that it would be necessary to use hard wood for the blocks, but we found that bass wood works fully as well, if not better than the cherry. In the actual printing, ordinary printers' ink was used and the screw press proved the most satisfactory, as more pressure could be obtained from this than from the others.

The illustrations and this description tell something of what was done, but nothing can show the interest and enthusiasm of the pupils, and the surprise of the regular teachers at finding so much to teach and the new life in the study, and I firmly believe that the time is not far distant when a printing outfit will be a part of every well equipped school.

The following is the outline used:

PRINTING.

ANCIENT WRITING MATERIALS.

A. Among primitive races in general.
  I. Rock and sharp pointed instrument.
  II. Tablets of stone and stilus.
  III. Wooden tablets.

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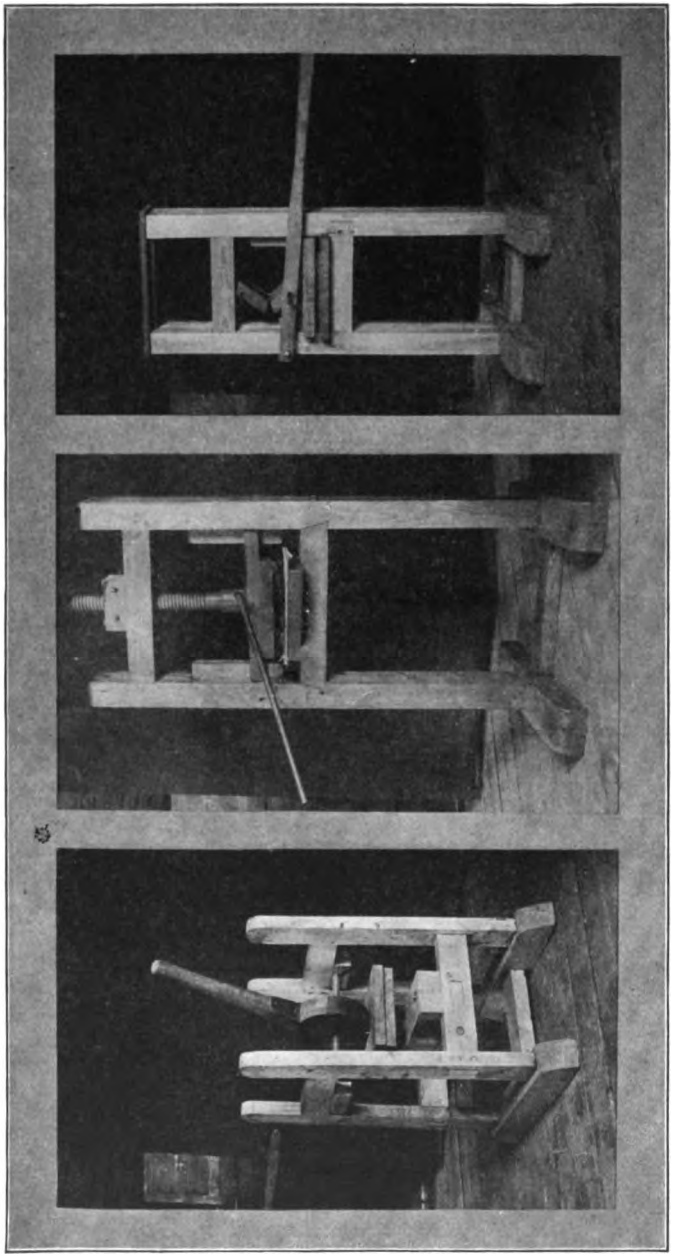

PRINTING PRESSES MADE BY GRAMMAR SCHOOL PUPILS, SPRINGFIELD, MASS.

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B. In Egypt.
  I. Wall Inscriptions.
  II. Papyrus.
    a. How prepared.
    b. Rolls.
      1. Where discovered.
      2. Appearance and state of preservation.
  III. Pens.
    a. How made.
  IV. Ink.
    a. Composition.
C. In Babylon and Assyria.
  I. Clay tablets.
D. Among the Hebrews.
  I. Soft stone tablets.
  II. Parchment.
    a. Preparation.
    b. Why it replaced papyrus.
    c. Special purposes for which it was used.
E. In Greece and Rome.
  I. Waxed tablets.
  II. Leaden and bronze tablets.

BOOKS AND LIBRARIES BEFORE THE INVENTION OF PRINTING.

A. In Classical Times.
  I. Egypt.
    a. Books.
      1. How made.
    b. Libraries.
      1. Alexandrian.
  II. Babylon and Assyria.
    a. Books.
      1. How made.
    b. Libraries.
      1. Royal Library of Nineveh.
  III. Greece and Rome.
    a. Books.
      1. How made.
    b. Libraries.
      1. Private.
        (a) Caesar's interest in.
        (b) Number under Constantine.
B. During Middle Ages in Europe.
  1. Books.
    a. Where and how made.
    b. Value.

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c. Kinds of books made.
d. Famous books.
1. Book of Kells.
2. Lindesfarne Gospels.

II. Libraries.
a. Destruction by Danes.
b. Work of Alfred the Great in England.
c. Effect of Renaissance.
d. Effect of Reformation.

CHINESE PRINTING.

A. Date of invention.
B. Description of process.
C. Invention of movable types.
D. Pay of Chinese printers.

THE INVENTION OF PRINTING.

A. Introduction.
I. Bookmaking before 1350.
II. Block printing.
a. Playing cards.
b. Image prints.
c. Block books.
1. Kinds.
2. How printed.
3. Where made.
4. Famous ones.
5. Number now in existence.
III. Preparation for printing.
a. Suitable materials.
b. Educational progress.
B. Invention of movable types.
I. Why cast types only are of use.
II. Controversy over.
a. Gutenberg.
1. Work in Strassburg.
2. Work in Mainz.
(a) Suspension of work in 1462.
3. Fame.
(a) On what it rests mainly.
b. John Faust.
1. Connection with Gutenberg and Schoeffer.
2. Suspension of work.
3. Fame.
(a) On what it rests.
c. Koster.
1. So called "Koster Legend."

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C. Spread of art.
  I. Effect of quarrels of Archbishops.
  II. Work done in France, Italy and Germany.
D. How printing was regarded.

PRINTING IN ENGLAND AND AMERICA.

A. England.
  1. William Caxton.
    a. Birth and early life.
    b. Life and work in Bruges.
      1. Connection with association of merchants.
      2. Work in service of Edward IV's sister.
      3. Printing of "The Recuyell of the Histories of Troye."
    c. Return to England.
    d. Work in England as an editor, translator and publisher
    e. Influence upon English language.
B. America.
  I. Where printing began.
  II. United States.
    a. First printing press.
      1. Where and by whom set up.
      2. Work.
    b. Number of presses before Revolution.
    c. Increase in number of presses after Revolution.
    d. Early newspapers.
    e. Benjamin Franklin.
      1. Apprenticeship.
      2. Work in Philadelphia.
        (a) Industry.
        (b) Government printing.
        (c) Purchase of "Pennsylvania Gazette."
        (d) Poor Richard's Almanac.
          (1) Influence of
        (e) Speech of Father Abraham.
C. Comparisons between the early days and the present time.

REFERENCE BOOK.

"Printing and Writing Materials".....Adele Millicent Smith
"The Story of Books".....Gertrude B. Rawlings
"The Invention of Printing".....De Vinne
"The Old Printer".....Knight
"Caxton and the Art of Printing".....Religious Tract Society, London
"Gutenberg and the Art of Printing".....Emily C. Pearson

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OUTLINE OF A HIGH SCHOOL COURSE IN METAL-WORKING.

CHARLES A. BENNETT.

DURING the past two years a movement has been gathering strength in Illinois which looks toward a generally accepted standard for high school courses in the manual arts throughout the state. This movement began at the University of Illinois during the summer session of 1906 when Professor H. A. Hollister, state high school inspector for the University, called together several members of the summer school faculty for an evening conference at his home. A few weeks later Professor Hollister sent the following questions to persons from whom he was seeking advice:

1. Are the manual arts, such as manual training and household arts, subjects properly to be considered as part of a student's preparation for admission to college, or are they merely accessories to the better teaching of other things?

2. What would be the probable effect on the development of these activities if they were so defined as to result in unifying the work to such an end as that of preparation for college?

3. Does not such a definition involve the undertaking of a statement of the essential nature and quantity of work to be included in admission courses in manual arts?

4. Would such a statement require that we distinguish clearly as between manual arts for general educational effect, and manual arts as involved in the work of the trade school?

5. With what phases of the problem, then, should any preliminary discussion of these matters begin, with the idea in view of continuing the discussions from year to year until definite conclusions are reached, in the meantime supplementing theory by some careful investigations as to existing conditions and results where courses are now offered in high schools?

The immediate result of the replies to these questions was the addition of two departmental sessions to the program of the annual High School Conference which met at the University November 23, 24, 1906—one session for the discussion of manual training and one for drawing. At this conference, which was well attended by high school men from different parts of the state, the suggestion was made that four courses of work be outlined with reference to the needs of the high schools, which might also serve as possible basis for entrance credit at the University—one in each of the following: (1) woodworking, (2)

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OUTLINE OF ONE-YEAR HIGH SCHOOL

GROUP	PROCESSES	SUGGESTED PROBLEMS
I—*Chipping and Filing.*	Chipping a block of metal with cold chisel and hammer, filing the same, testing Tool dressing	Chipping block (cast iron) Door key (brass) Wrench (malleable iron) Escutcheon (brass or steel)
II—*Fitting.*	Drilling, filing, fitting, riveting, finishing	Hinge (brass or steel) Calipers (steel) Dividers (steel)
III—*Bending.*	Bending while cold, drilling, riveting, punching	Bracket, lantern, lamp base
IV—*Soldering.*	Pattern-cutting, bending, folding, wiring, soldering	Pipe, cookie cutter, tin cup, funnel, pail, sconce
V—*Beating and Raising.*	Sawing, beating, drilling, filing, and polishing copper. Beating up a copper bowl, hard and soft soldering; repoussé, coloring by heat and chemicals; etching; annealing	Escutcheon, draw pull, finger plate, box with design in repoussé on cover, bowl, ink pot
VI—*Turning.*	Hand-tool turning, filing in lathe, polishing in lathe, thread cutting with tap and die, drilling, hardening and tempering, annealing.	Plumb-bob, hammer
VII—*Spinning.*	Cutting templet, turning form in wood to fit templet, spinning zinc, Britannia metal and copper, polishing, lacquering	Tray, bowl, box with cover, canopy for gas or electric fixture

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COURSE IN METALWORKING.

RELATION TO OTHER SUBJECTS	RELATION TO INDUSTRY
Drawing—Working drawing of exercises, design for escutcheon and key *Metallurgy*—Properties of cast iron, malleable iron, and brass	*Mining*—Getting the ore, geographical distribution, smelting, refining *Locksmithing*—Mechanism of lock *Tool making*
Drawing—Design for hinge, working drawing of calipers and dividers *Metallurgy*—Properties and kinds of steel	*Steel making*—Bessemer and other processes *Tool making*
Drawing—Designing lantern, bracket, lamp base	*Wrought metal work*
Drawing—Application of problems in developments of surfaces. *Metallurgy*—Tin	*Tinsmithing and Cornice making* *Mining*—Tin producing
Drawing—Designs for objects made *Metallurgy*—Copper	*Coppersmithing* *Mining*—Producing sheet copper *Jewelry*
Drawing—Working drawings	*Tool making*
Drawing—Designs for objects made *Metallurgy*—Zinc, Britannia metal	*Metal spinning* *Gas and electric fixture making*

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metalworking, (3) mechanical drawing, (4) freehand drawing and design.[1] This idea was accepted by the members of the conference and a committee was appointed to present outlines at the next annual conference. This was done[2] and on Nov. 23, 1907, the outlines presented, with but slight modifications, were recommended by the conference to the University as a proper basis for action with reference to college entrance credit.

The outline for woodworking was a revision and more detailed statement of the high school outline published in the state course of study[3], with the optional substitution of a course in wood-turning for some of the work in furniture construction. The report of the committee added further value to the outline by presenting a "suggestive treatment of problems" showing the relation of each problem named to (a) drawing and design, (b) other school subjects and (c) industry.

The outline for metalworking was treated in a similar manner, and as this, though old in content, was essentially a new formulation, it is given herewith in full and attention called to some of its features:

1. It is a manual training course *per se,* very rich in its opportunities for contact with industry, and involving a large number of elementary tool processes, yet without carrying any group of these processes so far as to make the course a trade course. In this respect it is more truly a manual training course than is a course in forging or machine tool work or pattern-making covering the same amount of time. In the field of metalworking it corresponds almost point for point with the course outlined for woodworking, and supplements that course in a most satisfactory way. The two together cover a large proportion of the fundamental tool processes represented in our great building and machine industries.

2. The course is equally rich in its opportunities to connect with the other branches of school work. Especially does it invite correlation with freehand drawing and design and with practical metallurgy. In all the branches of handwork taught in high schools none presents at the same time a more alluring and profitable field for instruction in applied design than does metalworking.

3. The course calls for only a very moderate equipment of tools and machinery—no expensive planer or shaper or milling machine, not even an engine lathe, but merely hand lathes such as are most desirable

[1] See Manual Training Magazine, Vol. VIII, Page 135.
[2] See Manual Training Magazine, Vol. IX, Page 160.
[3] See Manual Training Magazine Vol. IX, Page 254.

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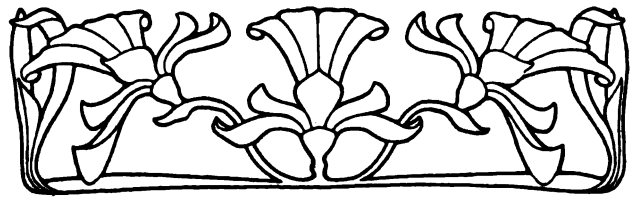
for wood-turning, perhaps a small sensitive drill, a few of the simpler machines for sheet-metal work, blow pipe, gas or portable forge and soldering furnaces, vises, and a variety of small tools, such as files, hammers, calipers, stakes, turning tools, etc. Two-thirds of the course can be taught without the hand lathes and in special cases it might be permissible to substitute extra work in beating and raising for the work in turning and spinning, which requires the use of the lathes, though it is believed that this would lessen considerably the value of the course to most students. But the cost of the lathes need not stand in the way of carrying out the entire course in most high schools, because the same lathes can be used for both wood and metal if good ones are purchased and extra centers, rests, and small chucks provided for the metal-working.

In conclusion it may be said that this course seems to be within the range of possibility for the smaller high schools and an excellent foundation course for any high school. It is a manual training course pure and simple, particularly adapted to a general high school, and therefore especiallv appropriate for entrance credit at the University. Following this course in the larger high schools, should come courses in pattern-making and foundry work, forging, and machine tool work, which are more technical or trade in character and are already, and appropriately, receiving advanced, or college credit at the University whenever they are carried out in a satisfactory manner under skilful instructors.



DRAWN BY A. BLUMENKRANZ.

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EDITORIAL

Herr Salamon Dead

We have to record the death of Otto Saloman, of Nääs, Sweden, the father of educational sloyd. He died November the third, two days after he had reached his fifty-eighth birthday. It is impossible in a single paragraph to fittingly express our appreciation of the work of this pioneer in manual training. This we hope to have done in these columns at another time. At present we can do no more than merely to call attention to the fact that throughout the entire civilized world wherever handwork has become an important factor in general education the influence of Herr Salomon's work has been either consciously or unconsciously felt. Some of the principles ennunciated by him in the early days of manual training were so sound and so fundamental that, whether his system as a whole has been accepted or rejected, these principles have been adopted almost everywhere. And so it has come about that not merely Sweden, but the entire educational world is indebted to Herr Salomon and will speak his name with respect and gratitude through generations to come.

The Founder of Bradley Institute

Another friend of manual training has passed on through the upper gate of this life. On the fifteenth of January, after several weeks of painful illness, Mrs. Lydia Bradley, the founder of Bradley Polytechnic Institute died at her home in Peoria. At the time of her death she was in her ninety-third year, yet up to within a few weeks of that time, she had kept so strong in body and mind that she was able to personally direct the management of her large estate, and while retaining so long her remarkable business capacity, she also kept correspondingly clearer her views on education. Mrs. Bradley believed that boys and girls should be taught to work as well as to study, and it was this belief that led her to found the Institute. But her noble gift was not inspired by a belief in some finely wrought theory of education; it was the result of experience and first-hand observation in an exceptionally long life of activity and close contact with business affairs. She had seen group after group—even generation after generation—of boys and girls come up through the schools to manhood and womanhood, and had watched their careers; she had observed the value and the defects of the schools as illustrated in their lives; and then, guided by her own keen and practical insight, she had reached the conclusion

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that the great fault with the schools was that, instead of fitting boys and girls to meet the serious problems of life, they too often unfitted them by placing a wrong estimate upon the value of work—skillful work with the hands. And so when, as a memorial to her husband and children, she made her great gift to education, she did it saying that she wanted "to teach the boys and girls how to work." Most eloquently in that act did she preach the gospel of education through work.

The story of Mrs. Bradley's life is easily told, as the world tells such stories, yet it was rich in its simplicity, in courageous acts, in devotion to duty, and loyalty to her city and her country. Briefly it is told in the following quotation from a recent article by Director Theodore C. Burgess:

Although one of the oldest residents of Peoria, this city was not Mrs. Bradley's birthplace. She was born in Vevay, Indiana, a little west of Cincinnati, July 31, 1816. Her ancestry on both sides had honorable records in the Revolutionary War. After the close of the war for independence, her father, a Baptist minister, settled in Virginia, but soon moved to a large plantation in Kentucky. A growing objection to slavery caused him to leave that state, and he crossed the Ohio river into Indiana. Mrs. Bradley's early life was passed here. Her schooling was gained in an old log school house. There were few books in those days. Life was simple and sincere. Though her father was a man of considerable means every member of the family was a worker, and through practical experience Mrs. Bradley became master of everything pertaining to the care of a home. She thus gained a respect for industry and useful activity which never left her. After her marriage to Mr. Bradley (May 11, 1837) her strong opposition to slavery decided them to come to Illinois, rather than to Kentucky, which was Mr. Bradley's native state. Peoria was then a straggling village.

By fortunate purchases of real estate and successful operations in other lines of business the Bradley family prospered until, at Mr. Bradley's death (May 4, 1867), the wife's share in the estate was valued at one-half million. Mrs. Bradley, though entirely without business experience, soon proved that she possessed remarkable abilities. For under her direction the estate was not only preserved but rapidly increased, and what is more remarkable, her management of her property was such as to prove in every case beneficial to the community where it was located. In general it was her policy to develop real estate from acre property to city lots and from comparatively useless swamp-lands into rich farms. The drainage of vast tracts of submerged lands, heretofore almost valueless brought benefits to owners of lands adjoining almost equal to those gained by her.

Thus by her beneficient business methods as well as by her rich gifts to the city of her residence, Mrs. Bradley has well earned the esteem and gratitude of all citizens of Peoria and the surrounding community, as its greatest benefactor. It is unnecessary to enumerate here all her gifts. The most conspicuous are Bradley Park, probably the most beautiful natural park in the state, about 100

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acres in extent, and Bradley Polytechnic Institute. What disposition of property could be more wise or more widely beneficial? Each of these in a different way forms a contribution of inestimable value to the welfare of the city and one destined to be increasingly beneficial through future generations.

The London Congress

A recent circular received from the official headquarters indicates that plans are rapidly maturing for the Third International Congress for the Development of Drawing and Art Teaching to be held in London from August 3 to 8, 1908. The subjects which will be discussed at the congress are announced as follows:

(1) Drawing, in conjunction with modeling and manual wrok.
(2) The teaching of drawing in the professions, its definite inclusion in the university curriculum.
(3) The training of art teachers.
(4) The organization of professional art teaching.
(5) Schemes of apprenticeship and scholarship.
Progress made since the last congress.
(6) Unification of signs and symbols in mechanical drawing .
(7) Methods of disseminating ideas in art, and of developing public taste.
(8) International codification of terms used in the teaching of drawing.
(9) Experiments made toward establishing methods of teaching young children adapted to their nature and capacity.

A large and representative exhibition of all grades of school work in drawing and the crafts will be a feature of the congress. Already exhibits are assured from France, Germany, Italy, Austria, Japan and the United States. The exhibition will probably be open a few days before the opening of the congress and will remain open after August 8.

For the tailpieces on pages 323, 328 and 339 we are indebted to Dr. James P. Haney's Saturday class at New York University.

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ASSOCIATIONS

WILLIAM T. BAWDEN, Editor.

THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

The National Society for the Promotion of Industrial Education, which was organized in New York City in November, 1906, held its second meeting in Chicago, January 23-25, 1908. This meeting was remarkable for bringing together, for careful investigation and discussion of the problems of industrial education, the leaders of the three classes most vitally concerned: wage-earners, educators, and employers. The utmost good feeling and the spirit of co-operation prevailed. Every contribution was respectfully received and every session was marked by enthusiastic commendation of practical suggestions made by the various speakers.

As was inevitable in a program of its length, several promised speakers were unable to be present, though in most cases their places were well filled. As actually carried out the program presented an unusual array of big men and women and was a practical demonstration of the interest being taken in this new movement by those occupying high places of influence and authority.

To those who are accustomed to attending meetings of teachers and listening to discussions of professional themes it was most exhilarating to listen to papers prepared by those who view these problems from entirely different directions. It was also a most wholesome and instructive experience to observe something of the high quality of the leadership in charge of the various interests represented at this meeting.

The general sessions were held in Fullerton Hall at the Art Institute, and at nearly every session the hall was well filled. As an introduction to the meetings of the Society, several addresses were delivered at a luncheon given by the Ways and Means Committee of the Chicago Association of Commerce, at the Great Northern Hotel, Wednesday, January 22nd. The principal address was delivered by the secretary of the National Society, Professor Charles R. Richards, Teachers College, Columbia University. He said: "We must develop an industrial intelligence in America. The American boy is confessedly turning away from industry and going into offices, stores—anywhere he can earn money from the start and have clean clothes and clean hands. The boy who leaves school at 14 drifts for three or four years before he finds his place, such as it is, in life. It is these wasted years that we must use. We must diminish the army of the unequipped.

"There are boys, many of them, who chafe at book education. They are of a practical turn of mind. They see nothing 'real' in the training of the schools, and they leave them as soon as they can. After they have left school they drift. One boy that I know of after he started to earn his own living, spent the first two years out of school in this way: first, he started a boot-black

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stand, then he sold papers, then he worked in a restaurant, then in a laundry, then in an office, and finally he held horses outside of saloons.

"These are the wasted years of the boys who leave school before the industrial age. But they are the boys who furnish the material for our industries, and nothing but the development in the school of work which shall have a bread and butter value—a real life value—will hold them. In the elementary school it is not a problem of preparing boys specifically for a trade. It is one of equipping them for industry, and perhaps this is the biggest problem of all.

"As for the technical high schools the equipment is, in many of our cities, excellent. But in the judgment of many they are falling short of their purpose. They have been slow to admit a purely vocational purpose."

The first regular session of the Society was a public dinner at the Auditorium Hotel, Thursday evening, which was attended by about 450 guests. Theodore W. Robinson, first vice-president of the Illinois Steel Company, Chicago, presided in his capacity of chairman of the Illinois State Committee of the National Society. After calling the meeting to order he read a letter from President Roosevelt expressing keen interest in the industrial education movement and recommending this sort of training for the formative years, 14 to 18, now being wasted, or worse, by many of our youth.

Every one in the banquet hall arose as President Charles W. Eliot was introduced and only after prolonged applause did the banquetters resume their seats. President Eliot insisted that industrial education must mean trade education. He proposed that at the introduction of this training into our schools the compulsory education age limit should be raised three or four years. Children should be kept under public supervision and control until the 17th or 18th year of age and required to attend the trade schools unless they attend some other school. He demanded revision of taxation laws, as under present conditions there is no adequate means of raising the revenue necessary for much needed reforms. He advanced the idea that teachers in the elementary school should "sort" the children according to the walks in life for which they are most evidently fitted.

James W. VanCleave, St. Louis, president of the National Association of Manufacturers, quoted a statement that the United States has not so many trade schools as the kingdom of Bavaria which, with a population about equal to that of New York City, has 290 trade schools giving instruction night and day in 28 trades and crafts. "Our efforts have been too miscellaneous, too isolated, too haphazard. The aid of the national and state governments must be enlisted in the cause. There should be a commissioner of industrial education as head of a bureau of one of the administrative departments."

President Pritchett closed the program with a brief statement of the objects and methods of the campaign for national industrial education. "The problem is to be dealt with in a spirit of industrial peace—not a spirit of industrial war. We must show the workers that it is to them that this training is to be given. We need not be afraid to transplant or imitate. We can learn a good deal from Germany and other countries. The successful nations to-day are the Japs and the Germans, because they are good borrowers. If

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you cannot produce a good thing yourself the next best thing is to know how to borrow it.

"Within a year this Society hopes to be able to recommend to a municipality that wishes it, a model type of trade school such as has been pictured this evening."

Hon. Carroll D. Wright, Worcester, Mass., presided at the Friday morning session, the general topic for discussion being: "The apprenticeship system as a means for promoting industrial efficiency."

Accounts of apprenticeship systems now maintained by employers of large numbers of workers were presented by W. R. Warner, of Warner & Swasey Co., Cleveland, and J. F. Deems, superintendent of motive power, New York Central lines. Some of the statements made showed that the systems described offer every inducement to the exceptional and ambitious boy. He is the one who is to develop into the foreman, manager, or superintendent. Leslie W. Miller, principal of the Pennsylvania School of Industrial Art, claimed as one important function of the proposed schools the singling out of the promising boy and pushing him ahead. But, it seemed to many, as was pointed out at a later session, that the "boy in a thousand" may be left to look out for himself; a more important task is to raise the average of the rank and file.

W. B. Prescott, secretary of the supplemental trade education commission of the International Typographical Union, described the attempt being made to supply the printing trade with opportunities for technical instruction.

Dean H. Schneider, College of Engineering, University of Cincinnati, described the Cincinnati plan which provides a course six years in length, students spending every alternate week at work in some commercial establishment.

At the afternoon session Charles F. Perry, director of the Milwaukee School of Trades, answered the criticism that had been made that trade schools do not turn out finished workmen, calling attention to the fact that the law school is not condemned because it does not turn out experienced lawyers. He named the four elements of a trade school: 1. The method and commercial value of its instruction; 2. Quality and amount of equipment, which should provide for the four fundamental trades in about these proportions—drafting 5, patternmaking 15, molding 50-75, machinists 150-200; 3. The student himself; 4. The teaching staff, which should be made up of teachers who are true men in every sense, having expert knowledge of their trades and ability to impart instruction.

Milton P. Higgins, Worcester, Mass., speaking on the character of a trade school that will meet American industrial needs, declared that every trade school must be a productive shop. He did not believe in teaching boys to make articles not intended for the market. "Our trade schools have in the past been largely schools with a shop attachment. What they ought to be is shops with a school attachment. The shop of the typical trade school must be a productive one."

Henry Wallace, from Iowa, made a strong plea for the education of the farmer's boy. "The farmer of the nineteenth century was a land robber. If we do not educate our boys the fertile farms in Ohio, Illinois, and Iowa

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will soon be as barren as the farms in New England. The experiment stations we have are doing a great work in giving the young farmer the scientific knowledge that he so much needs. The boy must learn the 'why' of things. We do not need to bother about the 'how;' his father will make him learn that fast enough."

Trade schools for girls, according to Florence M. Marshall, Boston Trade School for Girls, must not require too long a period for training. The girl who comes to the trade school does so in order to find a way to earn her living, and for this reason must not be kept from remunerative employment any longer than is necessary. Furthermore, the school should attempt to teach only those trades in which skill has a real place.

Charles S. Howe, of Cleveland, president of the Case School of Applied Science, declared that the boy has a right to demand that society furnish him with an opportunity in life. He said there were too many unskilled and untrained workers drafted into the industrial army without opportunity for learning how to earn a living.

Mrs. Anna Carlin Spencer, of the Society for Ethical Culture, New York City, devoted the time allotted to her to attacking what she called "fallacies" relative to the industrial education of girls. She asserted that while the number of girls at any one time employed in industrial pursuits is comparatively small, the actual number entering such occupations in a given number of years is large, the apparent discrepancy lying in the fact that few continue in their vocation more than four years.

The speaker argued that the fact that employment is merely temporary is the strongest reason for seeing that the girls are placed in the best situations possible for their development. She asserted also that women, for the greater part, are still engaged in the things they always have done, with the change that now they "go out to do them," while formerly they did them at home. She insisted that the first aim of the trade school should be the giving of "cultural education," with boys a knowledge of agriculture, with girls a knowledge of the household arts.

Luke Grant, labor editor of the Chicago Record-Herald, who spoke on the attitude of the wage-earner toward industrial education, declared that the conference had laid too much stress upon the commercial side of the question and not enough upon the human side. He said that the specialization of industry was dehumanizing the worker and reducing him to the point where he was regarded as a mere machine, and that unless industrial education was introduced we soon should have a class of workers morally and mentally deficient and a product that would not hold its own in competition in the markets of the world. "We all are interested in the productivity of the worker, but we should not aim to increase production at the expense of the mental and moral vigor of our workers. The production of good American men and women is more important than the production of manufactured material."

Reasoning that the public trade school will attract and hold the child, that it will keep him from the successive stages of reluctance, truancy, and delinquency, and that its final product will be a working class, contented, self-confident, and honestly ambitions, Dr. Emil G. Hirsch, of Chicago, predicted that the installation of such a system nationally will mean the moral salvation

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of the American people. "Head, heart, and hand are the trinity that the true school must develop harmoniously. I look to the manual training school and the trade school for the influence that will help not only to make America a worthy competitor of Germany but to make America remember old ideals, to awaken the true morality that is sleeping, and to make it a blessing to all humanity." He deplored the fact that in the present school system the idea of imparting and acquiring information is always in the foreground—that the appeal is to the head, and only incidentally to the heart.

At the Saturday morning session the general topic for discussion was: "The true ideal of a public school system that aims to benefit all." Superintendent L. D. Harvey, Menomonie, Wis., said: "The elementary and high schools should not be diverted from the best educational service of the majority of those who attend them in favor of preparation of pupils for college courses. The high schools are maintained by the people for the people and not for the colleges. The elementary schools are maintained by the people for the people and not for the high schools. At one time the needs of the majority of those attending the high schools was preparation for college, but that no longer is the case, for a large majority of those who attend never go to college.

"As the schools are now conducted more than ninety per cent of those who pass through the elementary school go into a life of manual labor with no preparation for the performance of skillful work. There are three courses left open for these: to enter the field of unskilled labor at low wages, to enter the field of skilled labor at the bottom and at the lowest wage, with no chance for immediate advancement, or to prey upon society. This should not be. The elementary school should teach the elementary use of tools in a general way. The high school should teach a continuation of this course in skilled handiwork, but we need trade schools in addition to these. Pupils will attend school longer when the schools do more to increase the pupil's earning power."

The small percentage of men now engaged in the learned professions compared with those in agriculture, manufacture, transportation, or trade pursuits, was emphasized by Samuel B. Donnelly, secretary of the Arbitration Board of the New York building trades. He said: "The college influence molded our public school system to its purpose, and the object of the college system was the attainment of 'culture' and the fitting of men for professional service. The college influence has yielded to the demands of society. A leisure class has no place in our social, industrial, or political life. Our whole educational system has been aimed at professional service, which furnishes employment to about one twenty-fourth of all the persons engaged in gainful occupations. There has been too much idealizing of the professional occupations and of the 'merchant prince.' The educator has failed to anticipate the economic changes resulting from a rapid industrial development."

Secretary Charles H. Morse, of the Massachusetts Commission, spoke of the progress of the industrial education movement in his state.

Miss Jane Addams, of Hull House, took part in the discussion following the reading of the papers. She said: "I am not ready to admit the difference between cultural and industrial education. Industry may look big

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and ugly, but every factory and machine tells its story of human interest and every experience in the industrial world contributes its mite to culture. I believe that the cultural idea in the education of children should not be dispensed with until the age of 16, at least, when it can better be determined what trade is best for a boy or girl and the special education to make him or her a good bread winner in a certain trade may begin. I think it would be a bold teacher indeed who in the elementary school period should determine what line of work a boy or girl must take up for life."

A unique feature of this session was the story told by Paul Kreutzpointner, physicist and metallurgist in the testing department of the Pennsylvania railroad company, of his apprenticeship under the old gild system, now extinct, in Munich.

At the business meeting Saturday afternoon the reports of officers and committees were listened to. Among the resolutions adopted were the following: Appointment of a committee of ten by the president of the Society to report on the relations of industrial training to the public school system of the United States; Conversion of the present state committees into state branches of the national society; Appointment by the board of managers of a national commissioner of the society; Appointment of a committee to co-operate with the Department of Superintendence at its meeting at Washington in February.

The following officers were elected for 1908-09: President, Carroll D. Wright, Worcester, Mass.; Vice-President, Magnus W. Alexander, Lynn, Mass.; Treasurer, Frederick G. Pratt, New York. According to the provision of the Constitution the Secretary is elected by the Board of Managers. —W. T. B.

THE ILLINOIS MANUAL ARTS ASSOCIATION.

The Illinois Manual Arts Association held its fifth annual meeting at Bradley Polytechnic Institute, Peoria, Friday and Saturday, February 7-8. Heretofore this Association has contented itself with two sessions at its annual meetings, but this year the executive committee decided to offer a third session, on Friday afternoon, as an experiment. The innovation met with such favor that the plan will very likely be continued.

Local interest in the work of the Association was aroused to such a degree that the public schools were closed on Friday afternoon in order to allow the teachers to attend the meeting. As a consequence the audience that greeted the speakers that afternoon, not far from 350 in number, was by far the largest that has been known in the history of the Association.

The leading feature of the program, as heretofore, was the Banquet on Friday evening. The spacious dining room of Bradley Institute was stretched to its capacity and covers were laid for one hundred guests. Still there were twenty-five or thirty for whom plates could not be provided who came in after the dinner and listened to the program.

The deliberations of the Association were ably presided over by the President, Fred D. Crawshaw, principal of the Franklin School, Peoria. The program on Friday afternoon opened with the report of the Committee on Course of Study in Manual Training for the Elementary Grades. The members of the

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committee are: Seymour L. Smith, State Normal School, DeKalb, chairman; Louis H. Burch, State Normal School, Macomb; Harvey G. Hatch, Public Schools, Rockford; Sinclair J. Work, Elgin; L. A. Flagler, Peoria. After a brief introduction by Mr. Hatch the report of the committee was presented by the chairman. Mimeographed copies of the outline of the work done by the Committee to date had been prepared and were distributed. From this outline the following extracts are taken:

"The purpose of this report is to formulate a basis for a course of study in the manual arts. Education is such a progressive organizing of the activities, ideas, and desires of the individual that the individual becomes socially efficient and progressive.

"Psychologists are agreed that man becomes adjusted to the environment which his race has made only by reproducing in his own mental history the mental history of the race. The individual must acquire his power and incentives in much the same way the race has acquired them.

"The modern industrial system resulting in a massing of people in industrial and commercial centers makes the problems of social life very complex. Under these conditions it is increasingly imperative that each individual see his work in its larger relations. This demands greater intellectual capacity and greater breadth of knowledge, greater understanding of human achievements and ideals, and stronger incentives for personal betterment and for helping life forward."

The report presented an analysis of the nature of the individual to be educated and of the function of the school, and concluded with a statement of guiding principles for the selection and arrangement of a course of study in the manual arts.

In discussing the report Miss Cushman, School of Education, said, in part: "I came to this meeting dreading to find some fixed course of study forced upon us but, instead, am delighted to find this committee in its report seeking unity rather than uniformity. ..... I should like to raise a question as to just what is to be the basis for the selection of the various forms of manual work. Are we, in choosing, to consider them from the standpoint of their present social value or from the point of view of their value in the development of the race?

"When the question is brought up of the relation of the trade school to our work I confess I am agitated, for I have seen so much of the subtlety with which the technical ideals of the higher schools creep into the elementary school. In the elementary school we are to develop the boy as well as the product."

Frank H. Selden, of the high school, University of Chicago, said, in continuing the discussion: "One of the greatest difficulties in planning the work of the elementary school is the fact that so few boys continue in school beyond the eighth grade." He cited the case of a class of engineering students no one of whom passed a certain examination. One of the students, when asked, said that in order to pass the examination it was necessary to *answer every question correctly*—not sixty per cent or seventy per cent.

"It is getting to be dangerous to mention 'joints,' but I believe the science of woodworking can be taught in a series of joints—I don't care so much for taborets and tables. Give a boy a course of a few selected joints correctly made and you develop in him intellectual power, and intelligent and

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scientific use of tools. But deliver me from the boy who thinks he can make a taboret—and can't!

"It is a mistake to think our manual training work is related in any way to art—it is more closely related to geometry and physics."

The next number on the program was the discussion of the report of the committee on Shopwork Courses which appeared in the Manual Training Magazine, December, 1907. In opening the discussion Charles A. Bennett, chairman of the committee, stated that the committee had been called into existence for a two-fold purpose. The University of Illinois had asked to have submitted a course in shopwork for its consideration with a view to establishing a basis for entrance credits, and the State Teachers' Association had asked to have such a course prepared for publication in the State Course of Study.

It was made clear that the organization of "models" indicated in the third column of the outline is merely suggestive. The committee considers as essential *some* classification of the processes involved in woodwork, but the particular list of models is non-essential.

"Manual Training, if it has won its way at all into the school—and we believe it has, has a right there just as much as any other subject. This meeting is an evidence of the faith in manual training and what it has accomplished. The point of view of the committee in preparing this outline is that manual training has a valuable content of its own. The idea for a long time was that manual training is simply a method of studying other subjects, and until recently there has been little recognition of the content of manual training."

Edward J. Lake, fine arts department, University of Illinois, said: "I am interested in the emphasis placed here upon the thought element. The lack of individuality is the prevailing weakness in much of the work we see. There *is* a parallel between art and manual training. Art and individuality go together. There should be art in our manual training and I can't see it in the making of a 'joint.'"

The next event on the program was the "social hour" preceding the Banquet, which was spent with much profit as well as pleasure among the exhibits. This report must be incomplete in that there is no space available for an adequate account of the exhibits, educational and commercial, arranged under the direction of Clinton S. VanDeusen, chairman of the committee.

Promptly at six thirty o'clock the officers of the Association led the way to the dining room where a delightful dinner was served by the young women of the Department of Domestic Economy of Bradley Institute, Miss Helen Day, director. The arrangement of subdued electric light bulbs in the form of a suspended tee-square and a sumptuous menu card in half-tone on tint block with design symbolic of the Stone Age were the work of Frank Crerie, department of manual arts, Bradley Institute. The literary numbers of the evening's program were agreeably interspersed with music by George Kellar who has a pleasing baritone voice.

President Crawshaw introduced Dr. T. C. Burgess, Director of Bradley Institute, who said he was glad to be able in a literal way to bid the Association "thrice welcome"—three of its five meetings having been held at Bradley Institute.

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The principal address of the evening was upon the topic: "Some Phases of our Eucational Problems with Reference to the Manual Arts," by Mrs. Ella Flagg Young, principal of the Chicago Normal School.. "The original conception of manual training as a means of education has been enlarged and enriched until today its values for all children in every grade are partially recognized. Evolution has, however, changed the problem in the schools, both on the side of method and on that of the arts. With the changes in our conception of ourselves as a nation has come, in industrial and commercial centers, an active demand for a new class of labor—a class whose children the public schools are expected to fit for a station and a work not necessarily in accord with the old ideal of what makes an American. The wide-awake manufacturer and some educational leaders have discovered a bogyman for America—the German trained in continuation schools, or in trade schools.

"This view is fully exploited in the annual report of Commissioner Draper of New York, published in January, 1908. Many, however, will be perplexed to understand whether his plea that the wage-earning masses be given a fair equivalent for the education bestowed on the children of the rich, aims to secure a better training for hand workers or to establish a sharper line of demarkation between masses and classes.

"The people have shown little interest in the argument for trade schools, the fundamental characteristic of the human parent being a longing to give his children a better oppportunity in life than he himself enjoyed. Doubtless he remembers that Americans, known as captains of industry, were not educated in trade schools. The great work of the elementary teacher is not to sort the children, to find those who must go early to a trade schools, but to discover along which lines the endowment of each child is most marked. Let the sixteen year old boys and girls take up a trade and learn it well, but make certain that before entering the trade school they shall have had their fair opportunity in the activities of a public school which makes the arts a vital part of its course of study. The arts make common ground on which children of the native born and of the foreign born meet in happy, intelligent, and ceaseless activity; training in them will go far to solve the difficulties of holding in workable relations the parts of our social structure with the heterogeneous elements that come on all too rapidly.

"One of the most extraordinary features of the present situation is the disregard of the relations of the decorative and constructive arts. At the recent convention in Chicago one speaker made reference to the value of the decorative arts, and that speaker is a representative labor union man. It is a bright day for craftsmanship in America when the labor men point out the value of art in developing not only the trade but the man working at the trade. Not only by the architects, the builders, the workers in metal have the arts, decorative and constructive, been rudely spearated; teachers of the arts have done the same thing—witness the chairs made of beautifully grained wood but ungainly form, bootjacks dcorated with roses, penwipers with lilies of the valley. The bow of promise, however, is bright on the horizon. Conditions within very recent times point to an advancement of training in the arts that will awaken and cultivate the true spirit of art throughout the American free school. Unite the teachers of art and

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the teachers of the arts in co-operative work, unite the arts, useful and beautiful, and there will come to be an American designer and an American carftsman that will have no cause to fear the German bogyman."

Mrs. Young was followed by William Hawley Smith, of Peoria, who said, in part: "As boy and man I have learned that when I want to drive a nail I must keep pounding away on one nail-head at a time. I am glad to add, to what has been said here about the relation of industrial work to the mental attitude of the men and women of this nation, a few words to you manual arts teachers and to as many others as can 'catch on.'" The story was then related of an old farmer who yielded to the seduction of an attractive handbill and went to a cicus for the first time. Taking the circular with him as a sort of guide to the exhibits he went through the menagerie comparing the different animals with their alleged descriptions with evident satisfaction. At last he came upon a camel, an animal that through some oversight had been omitted from the printed list. After viewing the beast from all sides and searching in vain through the circular for a description that would fit, he finally exclaimed in disgust: "Aw, shucks, there ain't no such animal."

"I tell you, there are too many people who put their faith in the printed word as over against their common sense. Up to the present time, the vast majority of mankind are like that man with the handbill. I believe that one important function of the kind of training you represent is to clarify the vision of the intellect of these young people who are to be the men and women of the future, so that they can form correct judgments. ..... Give the boy an ideal and then bring him through the training of his hand up to a realization of that ideal."

Mr. Smith then related a number of cases of gross miscarriage of justice—matters that he deemed more in need of being "uncovered" than the ruins of ancient Herculaneum, etc. For example, Congress required that by a certain date all railroad "locomotives and cars" should be equipped with safety couplings. On a certain road the tender of a locomotive was not so equipped and because of that fact a brakeman lost an arm in the discharge of his duties. His suit against the railroad was thrown out by the jury on the ground that a tender is "neither a locomotive nor a car." "I believe that men and women trained along these lines would never allow such judgments to be recorded."

Gerard T. Smith, superintendent of public schools, Peoria, was then introduced and spoke appreciatively of the place of manual training in the school system. He was followed by Oliver J. Bailey, president of the Board of Trustees of Bradley Institute, who made clear the lively interest in manual training on the part of the authorities of the Institute and their reasons therefor.

The next was the President's Address upon the subject: "The Manual Training Teacher's Position in the Educational World." Mr. Crawshaw proposed the question: "Are we, teachers of the manual arts, a unit in organized thought and action, in the sense that we are willing to follow a general outline for our work covering principles, method, and media?" To the lack of this unity is ascribed the opinion held by "many of our brother and sister teachers of other subjects that our specialty has sometimes been a necessary evil."

"We may not agree upon a particular progression or upon a common educational significance in our work. We must agree, however, that there shall

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be progression, and that the progression is educational because it plays a vital part in the child's development of a power to do and to do well. We must also agree to follow some particular progression which shall be indicated by a definite outline of work. It must be definite enough for each of us to follow it in doing particular things at particular times and, at the same time, flexible enough to allow each teacher to carry out his ideas to best fit local conditions.

"There was a time not long ago when we had system in the form of a set course of models. Please do not understand that I am pleading for a return of the Russian idea in manual training. No, what I think we need is a series of principles, not models—a definite understanding with reference to methods in work no matter in what exercises they may be used, and a basis for the selection and use of certain materials in particular school grades, rather than promiscuously using anything as a medium of expression in any grade. It is my opinion that until we can come together on common ground in some of these matters we shall continue to be criticized as unstable in our work and we shall fail to have the influence in educational work which shall be ours when we embody in our courses of study the application of that maxim in which we all believe: 'United we stand; divided we fall.'"

After the report of the secretary occurred the election of new members. The complete list of those elected to membership at the 1908 meeting is as follows: W. N. Brown, principal Sumner school, Peoria; F. H. Cogswell, Soldiers' Orphans' Home, Normal; Robert C. Craig, Oak Park; W. J. Craig, Belvidere; A. C. Duncan, Quincy; W. W. Emerling, township high school, LaSalle; L. A. Flagler, Peoria; G. L. Greves, Peoria; W. H. Henderson, Springfield; G. A. Hill, Rock Island; J. M. Humer, Springfield; E. J. Lake, University of Illinois, Urbana; H. C. Mohler, Galva; Miss Minnie N. Peterson, Peoria; G. F. Reinhard, Chicago; H. B. Ross, Indianapolis, Ind.; B. H. Smith, Rockford; Miss Carrie R. Sparks, Lincoln; R. S. Thompson, Chicago; E. R. Tompkins, Pontiac; C. E. White, Canton.

A committee on nominations was elected by ballot, as follows: Louis A. Bacon, Indianapolis, chairman; Seymour L. Smith, DeKalb; Clinton S. VanDeusen, Peoria.

The Saturday morning session began with the transaction of business. After discussion, it was decided to appropriate from the treasury an amount sufficient to make, with the contributions of individual members, a total of twenty-five dollars to be sent as a contribution from the Association to the London Congress Fund.

The executive committee was directed to print a complete list of names and addresses of members for distribution. Copies of this list may be obtained by non-members by application to the Secretary after March 1st.

The executive committee recommended that, in view of the fact that a number of members had withdrawn from the Association in previous years because of the $3 membership fee, the treasurer be instructed to reinstate members whose dues are in arrears upon the payment of $1 per year beginning with 1908-09.

A committee, Harvey G. Hatch, Rockford, chairman, was appointed to report next year upon suggested constitutional ammendments.

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The treasurer's report was presented showing: receipts, $183.99; expenditures, $147.46; balance, $36.53.

The report of the committee on nominations, after having been referred back to the committee for reconsideration, was adopted in its final form and the following officers elected for 1908-09: President, Louis H. Burch, State Normal School, Macomb; Vice-President, Miss Anna G. Brown, Jacksonville; Secretary-Treasurer, Ira S. Griffith, Oak Park.

It was necessary to resort to a ballot to determine the place of meeting for 1900. Rockford was selected by a vote of 17, to 15 for Jacksonville.

After the business meeting two papers completed the program. To many the most interesting and practically helpful feature of the entire meeting was the paper, with the discussion which followed, by Ira S. Griffith, Oak Park, on the "Organization of Manual Training in the Grammar Grades." Mr. Griffith described in detail the experiment he is conducting, with his grammar grade classes, with a modified form of the shopwork course outlined in the Illinois State Course of Study already referred to in this report. In an admirable way the value of the outline in organizing and unifying the work was shown, and at the same time the flexibility of the course, allowing ample scope for the individuality of the teacher and permitting adaptation to particular classes or school conditions. The paper was illustrated by numerous stereopticon slides showing the variety of problems worked out in following the outline.

"In order to develop in the highest degree independence of thought and power of initiative the pupil must be given opportunities for determining ends and working out means. Both of these are essential in true self-expression, and both are essential to the vitality of manual exercises in the school.

"The manual training movement is to be congratulated in that all signs just now seem to point to its speedy delivery from the hands of pedagogical or psychological extremists. Out of past experience with the joint-making Russian system with its admitted disciplinary value, the Swedish model-making with its effort to utilize the energy of the worker towards useful products, and the self-expression of the pedagogical movement with its attendant elements of interest and initiative—is to come, it would seem, manual training practice that is to be marked by a combination of the best of these systems with a consequent elimination of the weaknesses of each."

In the discussion there was very evident an appreciation of the desirability, even necessity, of arriving at some basis of unity in the organization of the work in the manual arts which shall commend itself and be accepted generally.

The last paper was a carefully prepared report of a committee appointed to investigate "Individual-Motor-Driven *versus* Belt-Driven Machines for Manual Training Equipments." The committee consists of: William F. Raymond, Bradley Institute, Peoria, chairman; E. H. Sheldon, Chicago; John L. Bacon, University High School, Chicago; Clinton S. VanDeusen, Peoria. Several copies of this report will be prepared and persons especially interested are requested to correspond with the chairman of the committee.

The meeting of the Association adjourned at 12:30 p. m. —W. T. B

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IOWA STATE TEACHERS' ASSOCIATION.

The fifty-third annual session of the Iowa State Teachers' Association was held at Des Moines, Ia., Dec. 31, 1907, and Jan. 1, 2, 3, 1908. A noteworthy feature of the meeting was the value and position accorded to manual training, as a part of the regular school life, by various eminent educators who delivered addresses.

In the president's address, Supt. F. E. Lark, Onawa, Ia., pointed out the enormous growth of our country as a manufacturing nation. While more than eight millions of men are engaged in labor with their hands, little or nothing has been done by the public school to fit them for this work. Vitalization of our present courses of study; a closer relation between school and life, and well-equipped trades schools were presented as being urgently needed.

Dr. Thomas M. Balliet of New York University, gave an address on "Frills and Fads in Education." He said that present studies came into the school because conditions demanded them. Those more modern subjects, so often spoken of as "fads" are, in reality, not such, but deserve a place because modern life demands them.

Dr. James P. Haney, director of manual arts, New York City, spoke on "The Manual Arts in the Elementary School." Lack of space forbids a full report of this excellent address. In closing Dr. Haney said, "The things essential to success thus lie not in expensive equipment, in special forms of work, or formal order of exercises. Rather the secret is in the intimacy of the relation the work bears to immediate needs and interests, and the unity secured between it and the other subjects studied at the time. The arts, in other words, should be taught together, the design aiding the construction and the drawing aiding both. Co-ordination of the manual work with other school subjects should be achieved by having both relate to some common center of interest, determined by the teacher, in the light of suggestions of the trades, occupations, and home activities of the child's environment. In all the work there should be communal effort, the joint work of many that each may profit." Dr. Haney had with him an exhibit of work from the New York public schools, consisting of beautiful specimens of drawings, designs and constructive work in wood and cardboard.

Supt. Edwin G. Cooley, of Chicago, Ill., spoke on "Practical Education." The speaker voiced a sentiment that so many manual training advocates have feared to express, namely, that school should be so closely related to actual life that a boy or girl might know something of what the industrial world will expect of them, even to the extent of actually teaching trades.

The manual training round table had an excellent program under the leadership of Leroy P. Elliott of Iowa City, Ia. Paul A. Dietrichson of the North Des Moines High School, spoke on "Handling of Material and Bench Devices." The speaker emphasized the value of system and order about a school workshop. Various devices intended to facilitate work were shown, such as tool kits, bench book fitted with a triangular block for mitering, etc. This paper was followed by a timely discussion of the subject of equipments by Prof. C. H. Bailey of the Iowa State Normal School. This discussion was

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greatly appreciated because so many Iowa schools are on the eve of beginning some hand work.

Supt. D. E. Brainerd, Logan, Iowa, gave an address upon the topic "Industrial Work in the Rural Schools." Supt. Brainerd illustrated his paper by an exhibit of work done in the schools of his county. This showed that such work has been centered about the home and farm life of the pupils. Some articles are made at school, others at home. In all cases this work has led to an increased interest in school work, on the part of both parents and children, and results will doubtless show that the rural school will eventually have hand work a vital part of its curriculum.

After the regular program had ended, Dr. Haney kindly consented to speak to the manual training and drawing teachers who had come in. Dr. Haney spoke for over an hour upon the general topic of design, illustrating each point by blackboard drawings as he, in turn, took up line, mass, structure, and points of force. Lastly he gave an extremely practical method of teaching the subject in our public schools. Three essentials were given:

1. Have some illustrative material (work of pupils, etc.)
2. Make, and show conventalized plant forms.
3. Plan definite masses first, then fill in the smaller details.

Paul A. Dietrichson, North Des Moines, was elected leader for next year. Miss E. J. Wing, Tipton, was elected secretary. At a joint meeting of both drawing and manual training teachers a Drawing and Manual Training Section was organized for next year. Miss Emma Gratton, Supervisor of Drawing, Cedar Rapids, was elected president, and A. C. Newell, Supervisor of Manual Training, Des Moines, secretary.

In short this session was a splendid treat and its influence will count for much in the development of the manual arts in Iowa schools.

ALBERT F. SIEPERT.

EASTERN MANUAL TRAINING ASSOCIATION.

The latest information in regard to the annual meeting of the Eastern Manual Training Association to be held in Washington, April 13, 14 and 15, is as follows:

Honorable James Wilson, Secretary of Agriculture, will give an address on the opening evening. There will be round tables on manual training for boys, domestic science and arts, and normal schools. Irene E. McDermott of Allegheny, Pa., has accepted the chairmanship of the round table on "Domestic Science and Arts" and Alvin E. Dodd of Trenton, New Jersey, that on "Normal Schools." Frank O. Carpenter instructor of commercial geography in the English High School, Boston, will present an address on "The Source and Preparation of Materials", with an interesting exhibit. Industrial education will have a prominent place, one general session being devoted to it. Mr. Sensor, assistant superintendent of public instruction for New Jersey will speak on this subject, as applied to the needs of rural schools. Prof. Charles R. Richards of Teachers College, New York, will give a resumé of the Chicago convention of the Society for the Promotion of Industrial Education, especially discussing those things which bear most significantly upon manual training possibilities. Other speakers are to be announced. Reduced rates have been offered by some of the passenger

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associations and will doubtless be granted by the others. For final program, apply to the secretary, Annie F. Burbank, East Northfield, Mass.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

At the suggestion of the Indianapolis local committee the convention will be held one day earlier than previously announced, namely, from April 7 to 10. This will enable the Association to secure the fullest possible opportunities to see the public schools in session and to hold its exhibit under the most favorable circumstances. The program announced is an especially attractive one and there is every reason to believe that the meeting this year will be one of the greatest in the history of the association.

SCHOOL CRAFTS CLUB.

The first regular meeting of the year was held at hotel Chelsea, 222 W. 23d St., New York City, on Friday, November 15, 1907, at eight P. M. The meeting was largely attended, and ten candidates were elected to membership.

The program of the evening consisted of:

1. "Manual Training as a State Problem in New Jersey." Discussed by A. E. Dodd in describing his summer's work in Cape May, N. J.

2. "Manual Training as a State Problem in Vermont." Discussed by L. W. Wahlstrom in describing his summer's work at Woodstock, Vt.

The second regular meeting was held at Hotel Chelsea, on Friday evening, January 17, 1908, and was preceded by a dinner at 6:30 o'clock. This meeting was very largely attended, and eight candidates were elected to membership.

The program consisted of a paper by Mr. McNary on "Mechanical Projects as Manual Training." This paper was discussed by Messrs. Weick, Reagle, Garritt, and A. W. Richards. The paper and discussions were illustrated by numerous working models.

WILLIAM A. WORTH.

The Cleveland Manual Training Club held its second meeting of the year at the Central Y. M. C. A. building, January 31st. Following the business meeting and supper, A. D. Kennedy gave an exceedingly interesting and instructive illustrated lecture on applied design.

The Manual Arts Section of the Minnesota Educational Association held two very interesting sessions at St. Paul. Every speaker named on the program was present and took part. The officers elected for next year are: president, George M. Brace, Duluth; secretary, Supt. H. L. Brown, St. James.

A committee, consisting of the officers and J. E. Painter, Minneapolis, was appointed to recommend a course in manual training for high schools of the state, to report at the next meeting.

The section meetings were as well attended as any of the Association and considerable interest was manifested by visiting superintendents in the subject of state uniformity in manual training work as a basis for the demand for recognition of such work in the entrance requirements at the university.

The report of the State Superintendent for 1907-08 shows that 73 high schools have manual training in some part of their four years' course. This is a gain of over 100 per cent in two years.

GEORGE M. BRACE.

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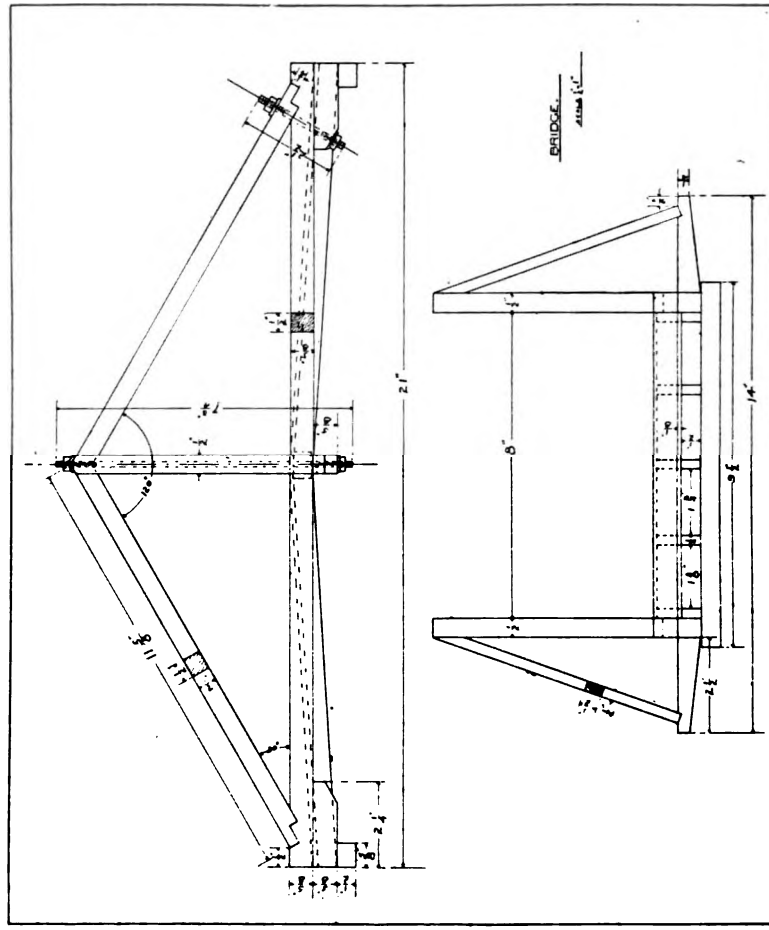

degree angle to BC. Lay batten braces on bottom chord at BD at an angle of 30 degrees and score outline of BDEFG.

6. Cut out groove for wire posts (ties) in top ends of batten braces.

7. Bore holes for long bolts in bottom chords and cross beams.

8. Clamp each batten brace and bottom chord and rest together in place and bore hole for small bolts.

9. Bolt trusses together, also cross beams. Screw on end cross rest.

10. Cut and lay floor beams and planks.

11. Make fit and nail in place side braces.

Georgia (Yellow) Pine is a good wood to use for this project.

Posts and bolts are of No. 10 iron wire. For nuts buy strips of soft iron ⅛ in. thick and ⅜ in. wide. This may be cut into squares drilled and threaded to fit the wire. A tap, die and small drill are necessary for this work.

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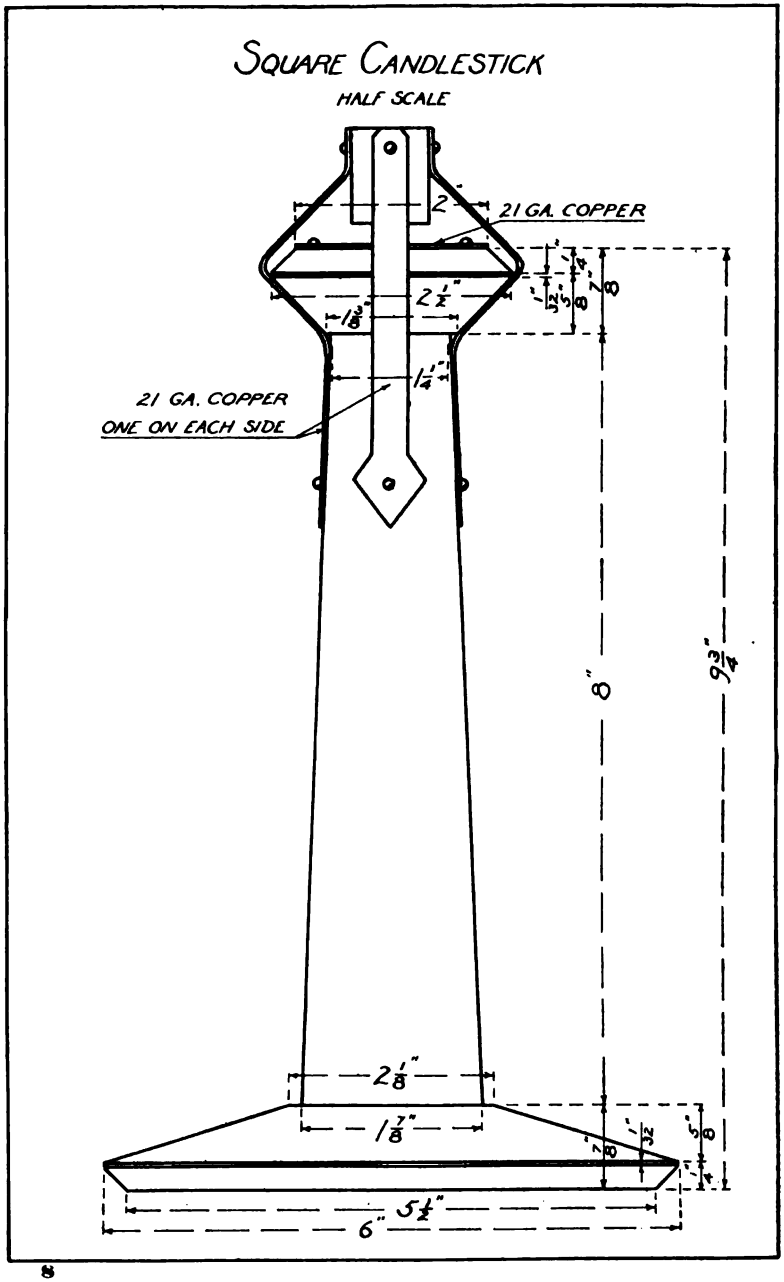
SQUARE CANDLESTICK
HALF SCALE
2"
21 GA. COPPER
2 1/2"
1 3/8"
1 1/4"
21 GA. COPPER
ONE ON EACH SIDE
1/32"
5/8"
1/4"
7/8"
8"
9 3/4"
2 1/8"
1 7/8"
1/32"
5/8"
1/4"
7/8"
5 1/2"
6"

8

PATTERN MAKING.

One of the most interesting lines of work in pattern making is the construction of patterns for some piece of shop machinery. In the accompanying photograph the patterns for the drill press will interest further inquiry at the Indianapolis Manual Training High School where the work was done.

Concerning the work at the Manual Training High School Mr. Covert writes as follows:

"Pattern-making is a subject that adapts itself nicely to the manual training course in a high school, even though the equipment is limited and only a small amount of manual training given. It is, we might say, a combination of joinery, or bench work in wood and wood-turning, only in a more advanced form, and is especially well adapted to teaching care and neatness and to form the basis of a series of talks or lectures on the construction and building of our great automatic and labor-saving machines of the day.

"In schools having as a part of their equipment a foundry and machine shop it is well to select some simple machine for the pupils to build which may be added to the equipment as the school grows. The wood-turning lathe is a good problem. In this, the patterns and castings may be made by the pattern-making pupils. In the machine shop the simple pieces serve as the elementary exercises, and the larger, more difficult parts to be machined may be given to the advanced pupils.

"The making of a set of standard patterns is always new to the pupils but the teacher must arrange the course and have at hand special work for the advanced pupils or those showing ability in order to keep himself from falling into a "rut" or becoming "narrow."

"There are two natural ways to present the subject of pattern-making to puplis. One is to put before them pattern drawings or blue prints, all allowance for draft, shrinkage and finish having been made by the draughtsman. The other method is to give the pupil drawings showing the finished dimensions thus requiring him to make allowance for machining, etc.

"A combination of the above two methods seems to the writer to be the better plan to work on when designing a course. This method of presenting the subject has proven very satisfactory in the Indianapolis Manual Training High School. The first few blue prints have on them a pattern drawing and also a drawing of the finished piece as shown in Fig. *1*. This is for the pupil to make a comparison between the pattern and the finished piece. Later on a drawing of the finished piece only is given thus making it necessary for the pupil to make allowance for finish or machining.

"In Fig. *1* is shown a pattern and a finished drawing of a tailstock cap for a lathe involving the use of a balanced core. Fig. *2* shows the exercise following Fig. *1*. On this blue print the pattern drawing is omitted and the pupils use from there on, only drawings showing the finished dimensions.

"In a course designed after the above scheme it is not necessary to make the two exercises in the pattern shop as shown in Figs. *1* and *2*. The pattern shown by Fig. *1* may be omitted, using it only for suggestions in changing from pattern drawings to drawings showing the finished piece. Fig. *3* shows the beginning and general trend of the work."

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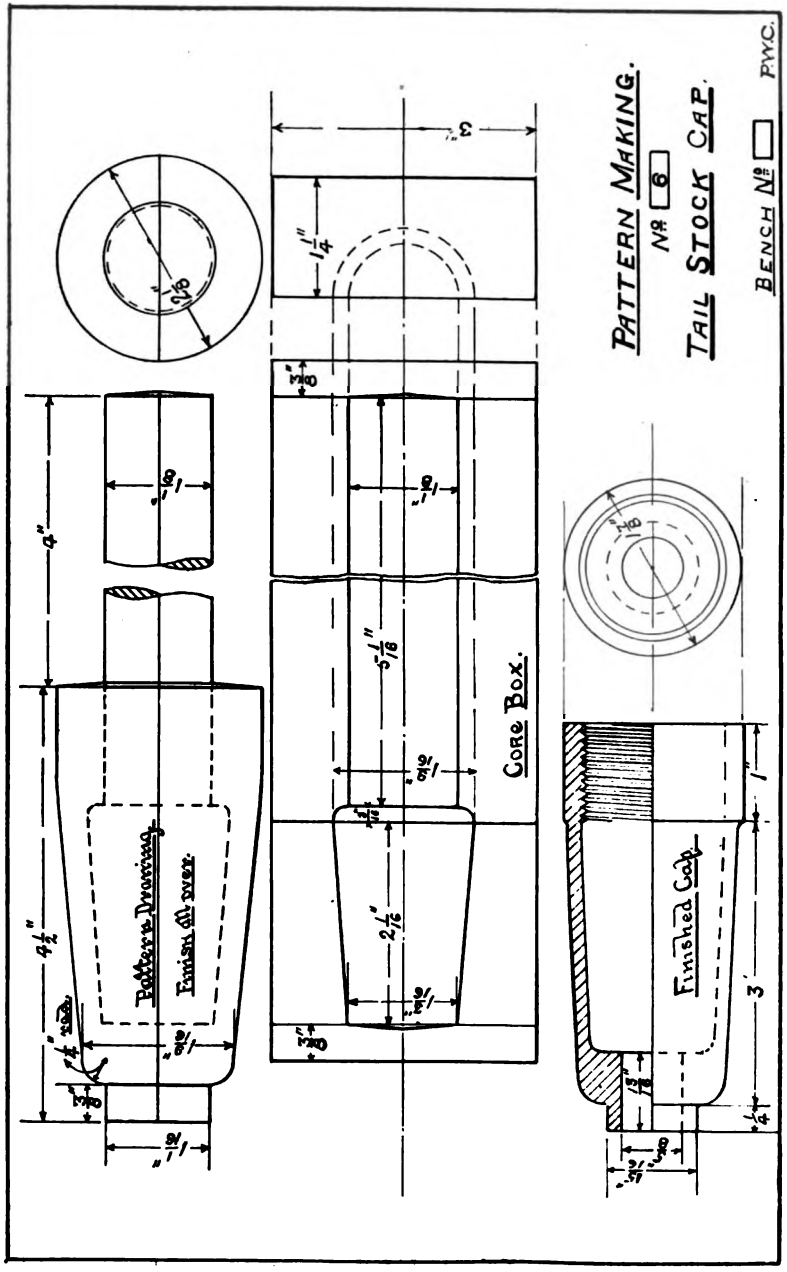

FIGURE 1

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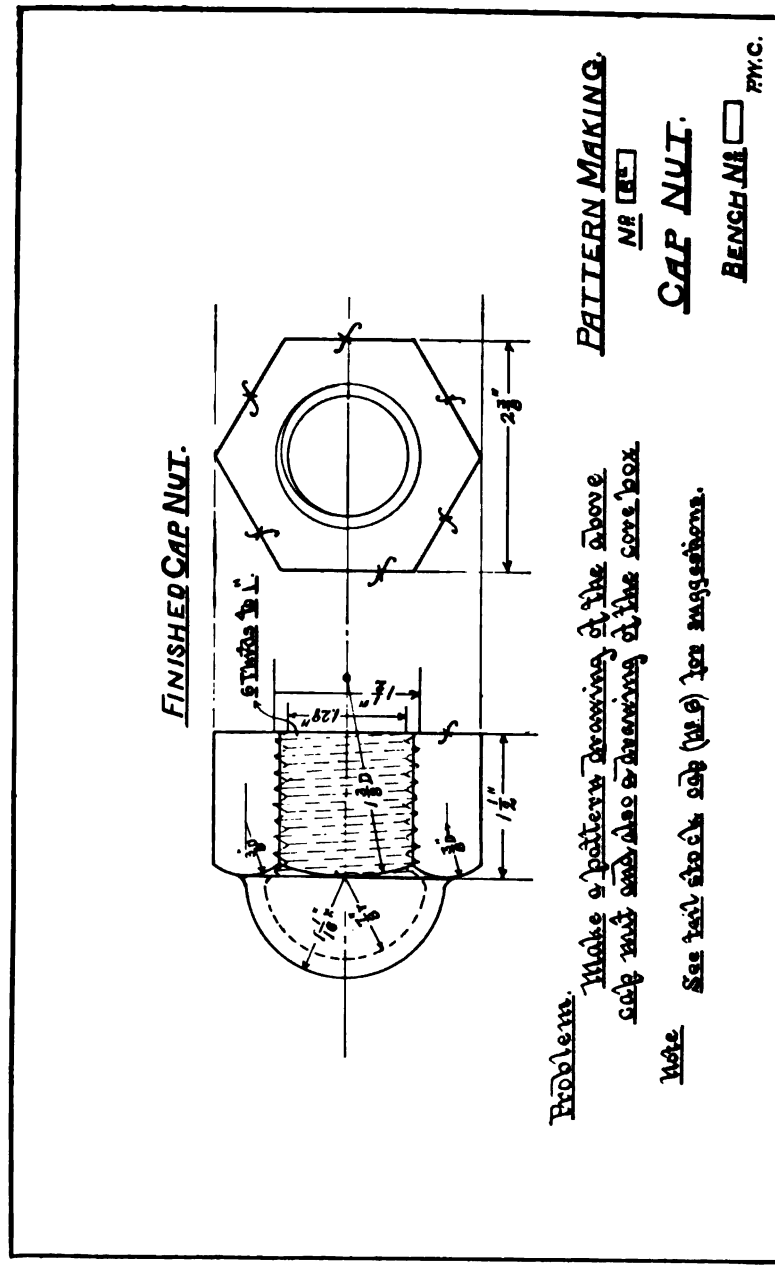

FIGURE 2

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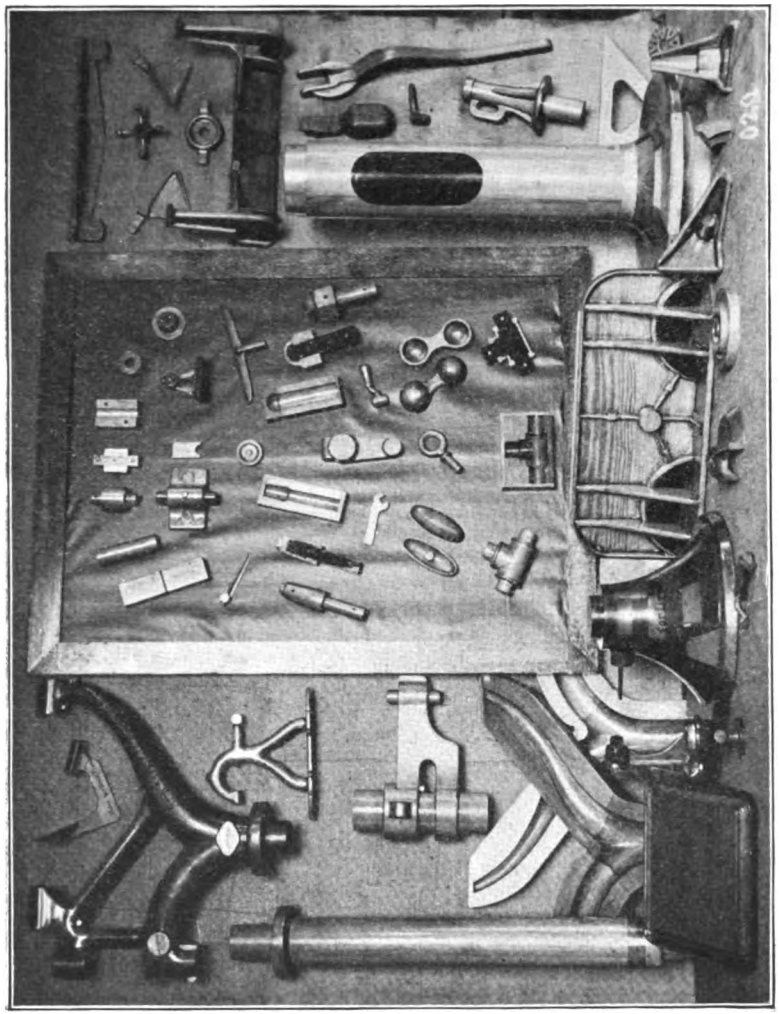

FIGURE 3.

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CURRENT ITEMS

CLINTON S. VAN DEUSEN, Editor.

The Massachusetts Commission on Industrial Education after a very careful consideration of the subject has submitted its report to the legislature recommending the establishment of an industrial college in which both day and evening courses shall be given; it also recommends that this college share with the Massachusetts Institute of Technology and Massachusetts Agricultural College in the sums paid to the State by the United States for this class of schools. The college is to be practically free to residents of the State, and is intended for men already trained in the shop. Most of the men would take the work in the evening but some would be able to give up work temporarily in order to avail themselves of such an opportunity for advancement.

The purpose of the college is to educate men for supervisory positions in the larger industries of the State.

While there are various qualities demanded in different supervisory positions, which range in scope from that of foreman to that of superintendent or manager, there is yet one feature common to all,—there must be a thorough grounding in the fundamental principles and practice of the calling. It will be the object of this college to teach those fundamental principles to such an extent as may be necessary to supplement the previously obtained practical experience, and also to give sufficient instruction concerning the shipping and selling departments in any particular industry.

The president of the board of education of New York city has appointed a committee to investigate trades schools, with an idea of learning what can be done for New York in this line. The committee consists of Frederick R. Coudert, Samuel B. Donnelly, John Greene, L. Katzenberg, and M. J. Sullivan.

It has been proposed that congress offer to each rural congressional district $10,000 annually toward the support of an agricultural high school.

A law is now before the Assembly of New York State, which, if passed, will greatly encourage the establishment and maintenance of technical and trade schools within the state. The law provides that the state shall supply five hundred dollars a year for each technical or trade school meeting the requirements of the law and employing one teacher; and two hundred dollars more is allowed for each additional teacher. The passage of this law would mean a rapid development of manual training in the state.

The National Civic Federation, through the generous co-operation of the International Mercantile Marine Company and that of Alfred Mosely, Esq., of London, has undertaken to arrange for a visit of 500 or more selected American teachers to inspect the schools and colleges of Great Britain and Ireland. A limited number can arrange to visit the Continental countries as well. Those who make this visit will be met on arrival by reception committees, with whom details as to places and schools to be visited can be arranged. The trip must be made during the months of September, October, November, Decem-

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ber 1908, and January, 1909, east bound; and between November, 1908, and March 15, 1909, westbound. The fare for the round trip, second cabin, will be twenty-five dollars.

The selection of teachers will be confined to those engaged in elementary and secondary schools, in industrial and technical schools of elementary and secondary school grade, and in institutions for the training of teachers.

In case more than 500 nominations are received the teachers selected to make the visit will be chosen equitably from different sections of the country and from different types or grades of educational work.

Nominations must be made by boards of education, boards of trustees of individual institutions, or other appropriate educational authorities, and no applications from individual teachers will be received unless transmitted through the appropriate educational authority and with its endorsement. In making allotments, preference will be given to nominations made by those educational authorities who propose to continue the stated compensation of the person named during his or her absence, for the purpose of making this visit.

Applications must be made in writing on or before June 1, 1908, on a form which will be sent upon application, to the executive secretary, Roland P. Falkner, 281 Fourth ave., New York, N. Y.

David S. McFarland has resigned his position as manual training instructor in the New York Orphanage to become director of manual training in the State Normal School at Strausburg, Pa. He entered upon his new duties in January.

More lumber was cut in the United States last year than in any other year in its history. The enormous amount of 37,550,736,000 board feet was produced and the mill value of this was $621,151,388. In addition, there were produced 11,858,260,000 shingles, valued at $24,155,555, and 3,812,807,000 lath, valued at $11,490,570. On the whole, it is safe to say that the present annual lumber cut of the United States approximates 40 billion feet, and the total mill value of the lumber, lath and shingles each year produced is not less than $700,000,000. These figures give some idea of how vast is the lumber industry and how great is the demand for its products.

A glance at the kinds of lumber produced shows very clearly the passing of white pine and oak, one the greatest softwood and the other the greatest hardwood which the forest has ever grown. Since 1899 the cut of white pine has fallen off more than 40 per cent, while that of white oak has fallen off more than 36 per cent. To-day yellow pine leads all other woods in amount cut, while Douglas fir—and this will be a surprise to many—comes second. Since 1899 the cut of Douglas fir has increased 186 per cent. Louisiana is the foremost yellow pine State, with Texas, Mississippi, and Arkansas following in order. Washington produces by far the greatest amount of Douglas fir.

A comparison of the lumber-producing States shows that since 1899 there have been many changes in their relative rank. Washington, which in 1899 stood sixth, now leads, while Wisconsin, which eight years ago led all others, is now third. In the same period Oregon, Louisiana, Mississippi, Idaho, and California made great strides as lumber-producing States, though, on the other hand, the amount produced in Michigan, Wisconsin, Minnesota, Georgia, Ken-

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tucky, Tennessee, Missouri, Indiana, and Ohio fell off anywhere from 29 to 54 per cent.

The highest-priced native woods are walnut, hickory, and ash, and the cheapest are larch and white fir. From the fact, however, that since 1899 the average increase in the price of lumber has been 49 per cent, it will not be long before cheap woods are few and far between.

Figures upon the lumber cut of the United States in 1906 are contained in Circular 122 of the Forest Service, which can be had upon application to the Forester, U. S. Department of Agriculture, Washington, D. C.

Alice Campbell, for many years instructor in cooking in the grammar grades of Cleveland, resigned January 31st to accept a position in Toledo. Her place was filled by Isla M. Campbell of Milwaukee, Wis.

Seventy per cent. of the cities of the United States of 8,000 population, or over, have manual training in some form in their public schools.

On February 3d a new manual training hall was opened in connection with the State Normal School at Cape Girardeau, Missouri.

Percy Nilson, formerly of Waltham, Mass., has been elected Supervisor of Manual Training in Fresno, Cal. Mr. Warner is teacher of mechanical drawing and Miss Mildred Linendou Director of Domestic Science at the same place..

In the fall of 1906 a small start was made in manual training work at Pontiac, Ill., with four benches and other equipment which was purchased with the premium money received on the drawing exhibit at the State Fair. The work done during that year received the blue ribbon at the State Fair and was so well received by the community that the board of education decided to equip two schools last fall. The Township High School was equipped with nineteen benches and tools and the Central School with twenty-three benches and tools. All boys of the sixth, seventh and eighth grades take the benchwork and the girls of the same grades have sewing while the boys are in shop. The work in the high school is optional but credit is allowed toward graduation. The work for both boys and girls is well received and will probably be extended next year. Ray Tompkins has charge of the woodwork in both schools.

Manual training work is greatly appreciated in Springfield, Ill., as is shown by the way in which the school board has provided for its rapid extension. Last year the work was carried on in three ward schools while now ten ward schools are fully equipped for the work of the boys of the seventh and eighth grades. Four domestic science kitchens have been installed for the girls of the eighth grade. Knife work is given to the boys of the fifth and sixth grades and sewing to the girls of the fifth, sixth and seventh grades. The high school has been re-equipped for benchwork and a two-year course in benchwork and sheet-metal work is given. Wilson H. Henderson is director of the manual training work. The boys in the seventh and eighth grades are taught by the principals under Mr. Henderson's supervision and the lower work is taught by the grade teachers.

Manual training was started in Columbus, Neb., about three years ago.. From a small beginning it has grown to an important department in the school work with a well-equipped building. The building, which is a combination manual training and gymnasium building, was supplied by the district but the

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equipment was furnished by the citizens. The manual training equipment consists of twelve benches, four high-speed lathes, four down-draft forges with all necessary tools and an eight horse power gas engine to supply the power.

The work in the first seven grades consists of weaving, basketry, clay modeling, pottery and wood carving; these are under the supervision of Estella Ross.

In the eighth grade the classes are divided, the girls taking sewing and the boys taking benchwork. In the ninth grade the boys choose between manual training and the languages. Fully fifty per cent choose the former. In the ninth and tenth grades the boys take joinery, furniture construction, turning forge work and mechanical drawing. The upper grade work for the boys is in charge of E. J. Huntemer.

BOSTON.

Frank M. Leavitt, assistant director of drawing and manual training, took part in the discussion of industrial education at the Washington session of the Department of Superintendents, N. E. A.

An enthusiastic party of manual training teachers of the Boston public schools is planning to attend the Washington meeting of the Eastern Manual Training Association.

The school committee have established a permanent exhibit of school work in suitable rooms in the new Normal School Building. Volunteer committees of teachers will keep it up to date. Its foundation has been laid by the installation of the exhibits returned from the Jamestown Exposition.

Beginning with February a new departure has been made in the manual training of the Boston schools by the introduction of elementary bookbinding. This is being conducted in about twenty classes of the sixth grade with good results. All the classes of the fifth grade throughout the city are also having this work for the last three months of the current school year.

Sheba E. Berry, formerly a grammar school teacher in the Lincoln School, South Boston, has been appointed to the manual training corps of teachers.

COLORADO.

For the benefit of the Manual Training Section of the State Teachers Association which convened in Denver December 30 to January 3, there was placed on exhibition manual training products of the grade schools of Denver. This was the most extensive exhibit ever held in Colorado and aroused great enthusiasm, not only among visiting teachers but also among the patrons of the schools, many hundreds of whom visited the rooms. The sewing exhibit which consisted of a great variety of garments, sofa pillows designed and worked by seventh grade pupils, embroidered table linen, and many household articles, was under the direction of Ida B. McGlauflin, supervisor of sewing, Denver Public Schools. The shop work under the direction of Milton Clauser showed skill in benchwork. Many pieces of furniture, picture frames, etc., for household decoration were on exhibition.

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The Manual Training High School of Denver is so overcrowded that the board of education has decided to use the Longfellow School, which is one of the largest grade schools in the city, as an annex to the Manual Training High. Eight or ten rooms will be opened for this purpose in September and the first year pupils entered there.

Mrs. Della J. Morris of Iowa, has been placed in charge of the department of domestic economy of the Pueblo schools.

RHODE ISLAND.

The Providence Technical high school has received one hundred and seventy pupils in its mid-year entering class, making a total of some six hundred and seventy-five students in attendance. There have been many changes in the faculty during this year. Among them the following: Wm. O. Hamblin head of the drawing department, accepted a similar position in Jersey City. Agustus F. Rose of the same department went to the East Boston high school. Mary A. Carpenter resigned from the domestic science department at the beginning of the mid-year. Arthur Ray teacher of woodwork is now teaching mechanical drawing. The new teachers in the drawing department are Chas. J. Martin, and Daisy L. Richardson. In domestic science Grace Hartman of Brown University and Bessie Goff of Simmons College, Boston, are substituting. In woodwork Mr. Richardson, of the Fore River Engine works pattern shops, is assisting Mr. Willis.

There has been a conference between the State Agricultural College and Brown University to avoid duplication of courses and to further the interests of these institutions and the state.

Howard O. Edwards, President of the State Agricultural College is furthering the movement for a federal department for technical research to be carried on in a similar manner to the agricultural experiment stations. Mechanical and technical problems will be worked out and manufacturers may consult the department and make use of its testing facilities.

KITE-MAKING AND KITE TOURNAMENT.

About a year ago systematic kite-making was instituted among the boys of the fifth, sixth, seventh, and eighth grades of the public schools of Los Angeles, California. With the assistance of the manual training teachers a great many kites of various shapes were successfully constructed. The athletic committee of the schools co-operated, and Superintendent E. C. Moore selected a day for a general tournament. Thus came to pass the first officially arranged kite tournament in the public schools in this country, so far as the writer is aware. This extraordinary affair was successful and about two thousand children and older people were present at the contest. While kite-making is of Chinese origin, yet there is much in it that is of high educational value for America.

Most of the work was done by the boys in the sloyd rooms after school hours, though some was done at home, thus connecting kite-making with the home and stimulating home work. Of course it is a seasonal occupation, which fact must be born in mind to avoid attempts at making it of permanent nature.

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This year however an attempt will be made to devote some part of the regular "manual training time", for the specific purpose of kite construction in the manual training rooms.

Of course the work is entirely optional with the pupils. An attempt will also be made to permit girls to take part in this construcion work and in the tournament. .

In the Los Angeles Schools there is an athletic committee whose duty it is to encourage and direct the various games and sports. This committee, consisting of principals and teachers together with the assistant manual training supervisor, arranged the scheme and day for the tournament, which was approved by the superintendent of the schools. A committee of judges was appointed to judge and award prizes consisting of diplomas signed by the judges and the superintendent of schools. The local papers wrote up the affair, which was thus successfully carried out.

It may be claimed for this work that as a sport it is clean and moral. It is also a stimulating agent in constructive home occupation. It prompts inventive fellows to assert themselves, and several original kites were invented in the schools and constructed by pupils. It has a peculiar relation to the active and important aerial navigation questions of today, in that it illustrates the wind as a motive power and air as a transit-agent. It seems therefore worth the while to point out these pertinent facts observed and involved in this new feature of manual training work in the public schools and present them to the public in the hope that they will be found useful. —C. A. KUNOU.

KITE TOURNAMENT, APRIL 11, 1908.

Provisional Program:

a. Most Artistic Kite. (See to color, harmony and outline.)
b. Quarter-mile Dash. (Reels, etc. may be used if preferred.)
c. Dirigible Kite. (Use two strings. Work for graceful movements.)
d. Strongest Single Puller. (Tandem not admitted in this class.)
e. Picture Kite. (Work for distance, as these kites are to be 400 feet away.)
f. High Flyer. (Best results obtained by means of tandem combinations.)
g. Best Animal Kite. (Including boy, girl, bird, animal, insect, etc.)
h. Dragon Kite. (Not to be included in the g. class.)
i. Streamer Exhibition. (American flags, etc. make good showing.)
j. Kite Invention. (Must be boy's or girl's own invention, '07 included.)
k. Best Tetrahedral. (To be judged largely on the ground, but must have made a successful flight.)
l. Yacht Race. (Will be one of the earlier events. New drawings coming.)
m. Model Airship. (Must be pupil's work.)
n. Parachute Display. (Definite release considered.)
o. Best Photograph from a Kite. (May be taken any time during the kite season previous to the tournament. Prints to be in by April 10th.

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REVIEWS

AN ELEMENTARY LABORATORY.

(Translated from the German by FRANK A. MANNY.)

The tree of accumulated knowledge is so large that no one can, in the brief space of a lifetime, hope to get thoroughly acquainted with all its branches and so tall is this tree that only a chosen few are allowed to explore the tipends of any one particular branch.

The acquiring of knowledge plays such an important part in the process of educating man that some people confound it with education itself. We hear people speak of someone being educated "along those lines," or we come in contact with people who "have had" such and such studies but whose memory and manners fail to support their claim to a genuine education.

We are living at a time when a large number of very important study-subjects are battling for a first-row place on the school program. With such persistent, clever arguments do these subjects assert their position that authorities are prone to neglect any one in favor of the rest. This is in part excusable for since, unfortunately, the learning period of the great masses of mankind has been fixed to be between the ages of 6 and 14—when shall these poor beings find out by what means they are likely to become educated most successfully. Would not, for instance, the child who is artistically inclined, be wronged if during the whole of his eight years schooling he were to have no opportunity to give expression to his natural talent?

Nevertheless, crowd as best we can, the time seems to have come when we begin to see that it is impossible to give a first-row place to each of the host of studies that appear to be "most important." Perhaps the simplifying of the school program may be the means of replacing much of the superficiality of today by a genuine thoroughness, more humility and more reverence.

Dr. Geo. Kerschensteiner, one of Germany's foremost educators in his latest work "Grundfragen der Schulorganisation" lays great stress on this simplifying of the program and he therefore gladly welcomes a book like the "Elementar Laboratorium" in which Raymund Fischer proposes to use manual training not as a distinct study by itself, but as a valuable aid while mastering problems in physics. The "Elementar Laboratorium" is published by Carl Schuell of Munich and it deserves the attention of all educators.

The book is full of illustrations, showing how with a remarkably small expenditure of money children can make 125 pieces of apparatus. Here and there work on similar lines has been done, but there appears to be no book on the market that so exhaustively treats of the subject.

Mr. Fischers' pupils have a scrap-box or closet into which are placed all the bits of wood, glass, tin cans, lead, nails and whatsoever they can find and which is of little value at home. From this well-ordered junk pile comes the material out of which are constructed the simplest plumb-line as well as the most wonderful electrical machine within the scope of the boys' ability. Of

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course a few articles like glass-tubing, drugs, etc. must be purchased. For certain work scraps from a saw-mill are obtained and the boys even buy some of the things at cheap auction sales. They are by far more interested in their work because of this gathering process than they would be if all the material were furnished by the school. There is a large percentage of voluntary home work which is probably the best result of Mr. Fischer's educational influence.

Because of the many plates in color the book is not so difficult to understand even for those whose knowledge of German is rudimentary. The book costs four Marks in Germany and can probably be had for $1.50 or less in this country through any book dealer. —FRITZ KOCH.

NOTES FROM THE GERMAN MANUAL TRAINING MAGAZINE.

By George F. Foth.

Twenty-five years of successful work has been done in the eight manual training schools of Dresden. This gives Dresden the foremost place among the German cities.

On the 2d of October, the question of manual training was brought up for the first time in the Leipsic City Council. It was decided to make manual training part of the school work in the new "Burgerschule" No. 10. Two basement rooms were set apart for this work and the sum of 1425 M. were appropriated for their equipment. The instruction is to be carried on in the afternoons between three and five o'clock. The work is to begin with the boys of the third and fourth classes, the fourth to receive instruction in cardboard and the third in the elements of benchwork in wood. The work will not be compulsory.

The twenty-fifth anniversary of the manual training school at Posen was celebrated on November 15th. All the manual training teachers of the city were present and Director Gaertig, the founder of the school, was commended for his successful work, not only in the city, but also in the province. The hope was expressed that he might be able to continue his great work in the cause of manual training for many years to come. Thereupon, in the name of the manual training teachers of Posen, he was presented with a statue idealizing work.

Barden is keeping pace with the manual training movement. In all newly planned public school buildings, consideration is being given to additional rooms for manual training. This is also true in Mannheim, Karlsruhe, Heidelberg, Pforzheim, and Freiburg. Manual training is now well established in the public schools of Mannheim, where 2215 boys receive instruction. They are allowed to choose between cardboard work, whittling, benchwork, metalwork, and modeling. One hundred and ten courses are taught by forty-seven teachers in fourteen work-rooms.

Year Book of the Council of Supervisors of the Manual Arts. Edward D. Griswold, secretary, Hastings-on-Hudson, N. Y. 6¾ x 10 in.; pp. 168+46 plates and many line cuts; price, $3.00.

This seventh year-book is a fitting successor to the helpful volumes that have preceded it. In illustrations it is richer than any previous volume and in the practical suggestiveness of its papers it keeps to the high standard set by this organization.

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The volume opens with a paper on "Constructive Work in Town Schools without Special Equipment" by Mabel B. Soper. This is an account of what has actually been accomplished in a Massachusetts town near Boston and makes one wish that the day would soon come when such work were being done in every town in our land. The second article is a discussion of "Centers of Interest in Handwork" by Cheshire L. Boone. "Woodworking in Country Schools," is discussed by M. W. Murray, "Toymaking as a Form of Constructive Work", is interestingly presented by Albert W. Garritt, and "Some Phases of Bookbinding in the Elementary Schools" is helpfully treated by Julia C. Cremins. And so one might continue through the entire volume.

Theodore M. Dilloway presents some striking and instructive contrasts in a paper entitled "Creating Ideals in Furniture Design," and in quite a different way Frank E. Mathewson gives some fresh material on designing for wrought metal work. "The Adaptation of Pattern to Material" is discussed by James P. Haney and illustrated with fifteen full-page plates, one of which is reproduced on the opposite page. This paper adds another to the remarkable series on applied design which Dr. Haney has produced during the past three years.

No one can really keep up to date with the literature of the Manual Arts who fails to read the Year-books of the Council as they make their annual appearance, and no working library on the manual arts is complete without them.

—B.

Sewing Manual. By Ida B. McGlauflin, supervisor of sewing in the public schools of Denver, Colorado. Published by the author; price, 50 cents.

This is a sixty-four page booklet giving a five-year course in school needlework. The course begins with the third grade, and outlines the work in detail. A list of words used in the sewing, which should be taught in each grade, is added to the outlines of work, also a chapter in which the several stitches are described, and another on textile fibers. The book bears evidence of being the result of practical experience, and it should be helpful to sewing teachers in other cities.

Textile Studies for the School Room. By Katherine F. Steiger, director of the domestic arts in the public schools of Rochester, N. Y. Published by the author; price, 25 cents.

This very attractively printed booklet contains the following chapters: A general outline of weaving exercises, helps for teachers, the making of a loom, how we learned to make thread, textile fibres, cotton, linen, wool, silk. At the end of the book is a bibliography.

The following have been received:

Third Annual Report of the Education Department of the State of New York. By Andrew S. Draper, Commissioner.

Simple Exercises Illustrating Some Applications of Chemistry to Agriculture. By K. L. Hatch, principal of Winnebago County School of Agriculture and Domestic Economy, Winneconne, Wis. U. S. Department of Agriculture Bulletin 195.

The Seasoning and Preservative Treatment of Hemlock and Tamarack Cross-ties. By W. F. Sherfesee. U. S. Department of Agriculture, Forestry Service, Circular 132.

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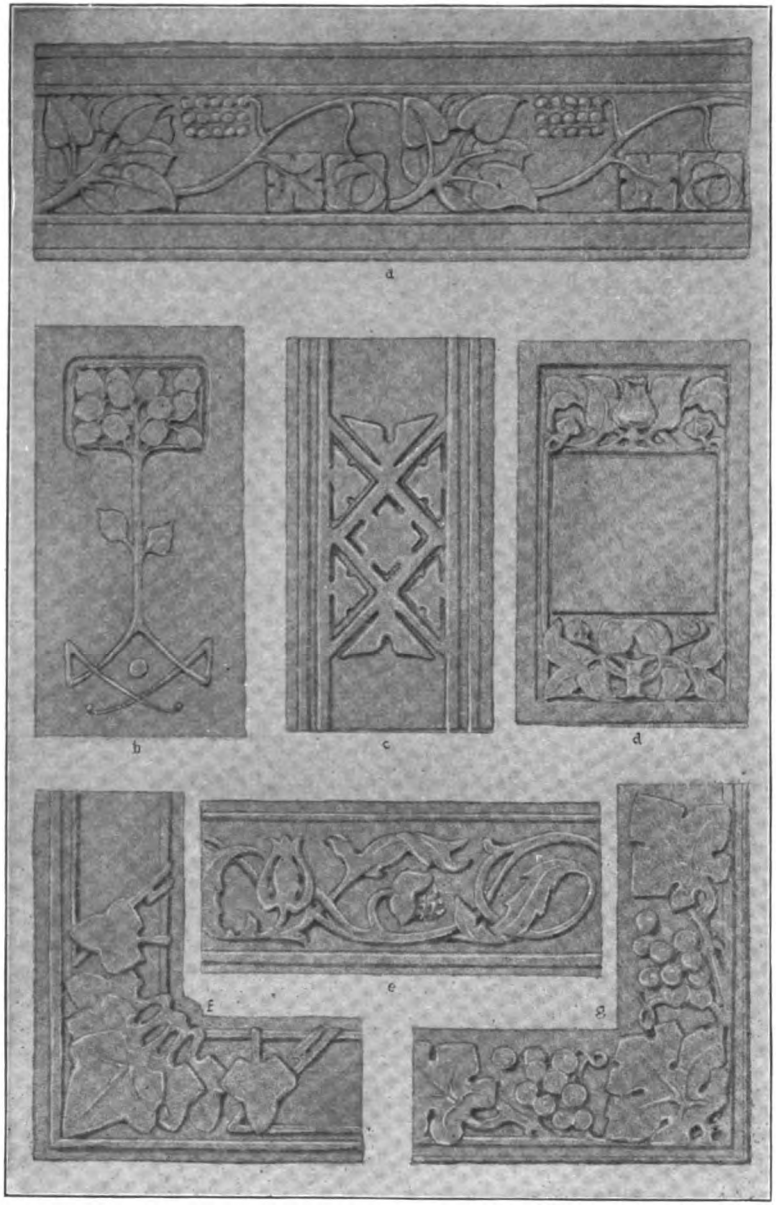

DESIGNS FOR TOOLED LEATHER BY JAMES P. HANEY IN YEAR-BOOK OF COUNCIL OF SUPERVISORS.

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The Lumber Cut of United States, 1906. By Gifford Pinchot. U. S. Department of Agriculture, Forest Service, Circular 122.

How to Read Plans. By Charles G. Peker, editor of "Woodworker's Review. Industrial Publication Co., New York, 1908; 5 x 7 in., pp. 46+8 plates of drawings, price 50 cents. A book written to help mechanics to read working drawings.

Addresses and Proceedings of the National Education Association, 1907. Report of the Los Angeles meeting containing an unusually large number of papers of special interest to teachers of manual training. Price, $2.00. Dr. Irwin Shepard, Secretary. Address Winona, Minnesota.

Proceedings of Joint Meeting. Report of the Cleveland meeting of the Eastern Art Teachers' Association, the Eastern Manual Training Association and the Western Drawing and Manual Training Association held May 8 to 11, 1907. Price, 50 cents. William T. Bawden, Chairman of Editorial Board, State Normal University, Normal, Ill. This attractively illustrated volume contains much that will interest teachers of the manual arts who did not attend the meeting, and certainly those who did attend will want it for reference.

Student Participation in School Government. By William R. Ward, Supervisor of Manual Training, State Normal School, New Paltz, N. Y., 1906. 5¼ x 7½ in.; pp.112; price, 50 cents.

This book is of immediate practical value to anyone contemplating the adoption of the "School City" idea. It is not a book of theories but of practical suggestions based on six years of experience. It tells in detail just how to proceed.

Report of Commissioner of Education, 1906, *Vol.* 2. Dr. Elmer E. Brown, Bureau of Education, Washington, D. C. Chapter XX contains fifty pages of statistics on manual and industrial training.

Seat Work and Industrial Occupations. By Mary L. Gilman and Elizabeth B. Williams, two principals of public schools in Minneapolis. The Macmillan Company, New York, 1905. 6 x 7½ in. pp. 141.

How to Make an Annunciator. By T. E. O'Donnell.

Making and Fixing Electric Bells and Batteries. By M. Cole.

A Small Electric Motor. By Wm. C. Houghton.

How to Grind and Set Edge Tools. By M. Cole.

These are small handbooks issued by the Sampson Publishing Co., 6 Beacon St., Boston, and sold at 10 cents each. Each is illustrated by one or more drawings.

School of Liberal Arts and Sciences for Non-Residents. A prospectus of a new plan for getting a college education without going to college. The instruction is individual and the examinations just as searching as in resident college work. On the faculty are some of the strongest men in the United States. For example, at the head of the department of education is Professor John Dewey of Columbia, and of fine arts Professor John C. Van Dyke of Rutgers. Hamilton W. Mabie is the chairman of the Educational Council. The executive offices are at 156 Fifth Ave., New York, and 512 Times Building, Pittsburg, Pa.

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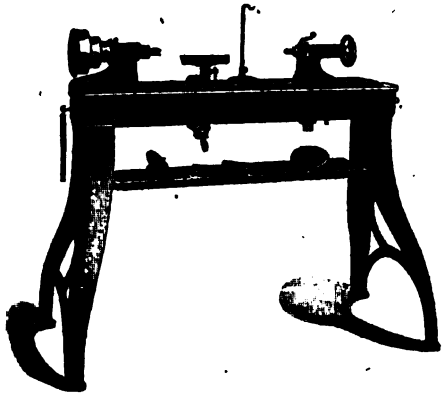

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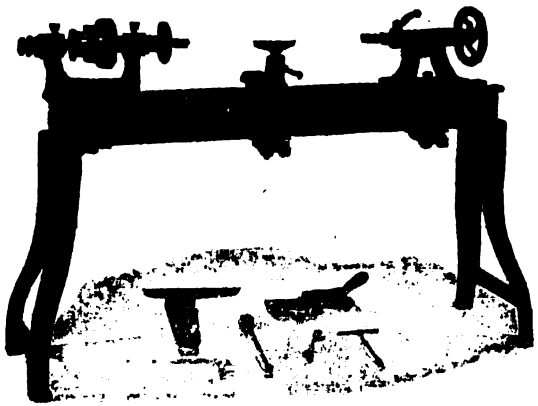

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Vol. IX JUNE, 1908 No.

MANUAL TRAINING MAGAZINE

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MANUAL TRAINING MAGAZINE

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VOLUME TEN

This number completes Volume IX. Already we have many articles promised for Volume X.

Cheshire L. Boone will continue his excellent series on the manual arts work of the lower grades. He will give considerable attention to shopwork, taking up problems in printing, water-wheels, pumps, electrical apparatus and perhaps the crafts of basketry, bookbinding and stenciling. From other writers also we are expecting helpful articles on the handwork of the lower grades.

A group of articles is being planned which will amplify and discuss in detail the units in manual arts recently defined by the North Central Association of Colleges and Secondary Schools. In this group will be articles by *Miss Helen Kinne* of Teachers College and *Paul W. Covert* of the Indianapolis Manual Training High School.

Among the articles on the practical details of shopwork will be one on the properties of wood by *William Noyes* of Teachers College, one on kite-making by *Charles M. Miller* of Los Angeles, one or more on methods and arrangement of subject-matter in grammar grade woodworking by *Ira S. Griffith* of Oak Park, Ill., and another on metalwork by *Augustus F. Rose* of Boston.

On organization and equipments we expect to publish articles by *G. George,* director of technical education in New Zealand; *Frank E. Mathewson* of the Technical High School, Springfield, Mass.; *L. H. Burch* of the State Normal School, Macomb, Ill.; *Charles B. Howe* of the Stuyvesant High School, New York City, and *James F. Barker,* principal of the new Technical High School, Cleveland.

Dr. James P. Haney will contribute a richly illustrated article on the decorative aspect of plant forms, and from several other writers we are expecting to secure articles on drawing and design.

As in the past, the Magazine will aim to give articles expressing the best thought on timely topics relating to the manual arts. During the coming year industrial education, the London congress, and the Civic Federation visit to English schools will receive special attention.

The Manual Training Magazine is kept for sale at McClurg's in Chicago, and Brentano's in New York

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CONTRIBUTORS TO THIS NUMBER

FRANK M. LEAVITT—Born in Roxbury, Mass., September 20, 1865. Early education in the public schools of Boston. Worked five years for a mercantile house, a few months in the factory of an electric company and then entered the Mass. Institute of Technology as a special student. Here he remained for three years, the latter part of the time as an assistant instructor. Since then he has studied pedagogy at the Harvard summer school and at the Sloyd Normal School at Nääs, Sweden. Mr. Leavitt was one of the first teachers of manual training in the Boston public schools, beginning in September, 1889. After a few years he was made principal of manual training schools and later assistant director of drawing and manual training. In these positions he has had almost complete direction of the organization and development of manual training in the Boston public schools. But Mr. Leavitt is not merely a teacher; he is true Bostonian; he has an avocation, or several of them, as well as a vocation. For fifteen years he has been on the executive committee of the Children's Mission, one of the oldest and most progressive child-helping agencies in the country, and for about five years on the board of directors of the Roxbury Charitable Society. He is a member of the Society of Arts and Crafts, and has been a member of the Handel and Haydn Society for twenty-two years and on the executive committee for nine years. Two years ago he was president of the manual training department of the National Education Association and a few weeks ago was elected president of the Eastern Manual Training Assosciation.

BEN WILEY JOHNSON—Born in Gilroy, California. Attended public schools of Philadelphia, Pa., and St. Louis, Mo., graduating from the St. Louis Manual Training School in the class of '89. After a year or two in the Missouri Pacific Railroad shops and the drafting room of an agricultural implement manufacturing company, the desire to go to college overcame financial difficulties, and two years were spent at Oberlin College, Ohio. The panic of '93 made the work of a book agent so unprofitable that college was given up for an opportunity to go to the Pacific Northwest and help run a shingle mill. After a year of this rough practical experience in the "tall timber," word reached him to try Seattle for manual training, with the result that work was begun under him in the Seattle High School, then enrolling less than 250 pupils. The work has expanded with the rapidly growing city from one teacher to thirty-four teachers in the manual arts department. In this transition Mr. Johnson has held successively the positions of head of the high school department of manual training, vice-principal of the high school and director of manual arts for the city system. In 1905 the educational exhibit of the state of Washington at the Lewis and Clark Exposition was assembled and exhibited under his direction. Mr. Johnson says that house-building and photography have been and are still delightful contributors to his broader interests and pleasures.

WILLIAM R. WARD—Born on a farm in Harlemville, N. Y. Attended a one-room rural school and later the village school. Began teaching in a rural school at eighteen years of age. After three years, worked at carpentry for a year and then again took up the work of teaching, becoming principal of a two-department school. After another three years, he resigned to enter the New Paltz Normal School as a student. After completing the three-year course in two years he was elected assistant in science and teacher of manual training in the Normal School. During the eight years since that time the manual training work has grown from nothing to a department giving instruction in benchwork, printing, lathe work and forging. Mr. Ward is the author of a book on "Student Participation in School Government."

JOHN C. BRODHEAD—Born in New York City. Received his education in the public schools of Brooklyn and Chicago and later at the Chicago Manual Training School, graduating in 1889. Then for four years was successively mechanical draftsman, machine shop foreman and superintendent. In 1893 he entered the historic Eliot School, Jamaica Plain, as an assistant in manual training. With the exception of two years when he was in the real estate business, designing and constructing frame buildings, he has been associated with this school in some capacity ever since, some of the time teaching mathematics and mechanical drawing in the evening classes. In 1896 he entered the service of the city of Boston as a teacher of woodworking and after teaching in several schools was appointed assistant to the director of manual training, which position he still holds. He is particularly concerned with the manual training work of the first six grades—paper and cardboard construction, weaving, bookbinding, clay modeling. Many of his summers have been spent in teaching manual training or in boys' camps. Mr. Brodhead was the first president of the Boston Manual Training Club and is an ex-president of the Eastern Manual Training Association. Aside from his profession he takes great delight in music and is superintendent of the alto chorus of the well-known Handel and Haydn Society of Boston.

FRED D. CRAWSHAW—Born in St. Paul, Minn. Graduated at the St. Paul Manual Training School (now the Mechanic Arts High School) in 1891, and from the St. Paul Business College in 1892. After working a year in a grocery store he entered the Worcester Polytechnic Institute, Worcester, Mass., where, in 1896, he received his degree in electrical engineering. The following year he taught manual training in the Minneapolis High School. From 1897 to 1903 he was an instructor in manual arts at Bradley Polytechnic Institute, and during this time taught

(Continued on Page VII)

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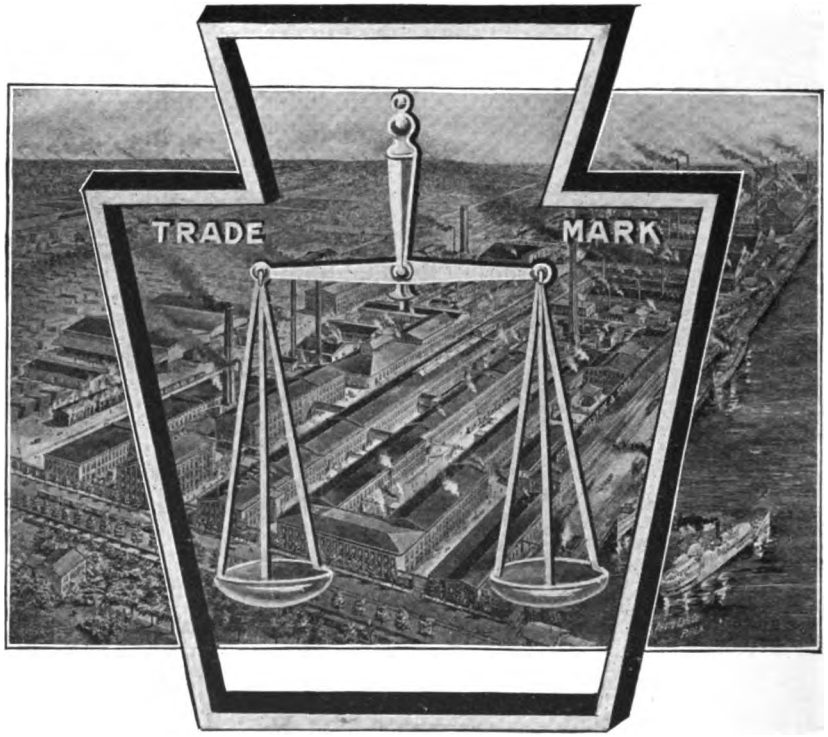

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VOLUME IX. NUMBER 5

MANUAL TRAINING MAGAZINE

JUNE, 1908

INDUSTRIAL EDUCATION IN THE ELEMENTARY SCHOOLS.

FRANK M. LEAVITT.

THE writer on this topic who wishes to secure general acceptance of his views must make careful definition of terms and definite limitation of the special phase of the subject with which he is to deal.

At the recent meeting of the Department of Superintendence of the National Education Association in Washington, an entire session was given to a symposium on the place of industries in public education. The closing words were given by Mr. George H. Martin, Secretary of the Massachusetts State Board of Education, who remarked that the discussions of the afternoon furnished ample evidence of the chaotic condition of the subject of industrial training. One fact which contributed to the seeming chaos of ideas was that those taking part in the discussion were frequently talking about widely different things. One speaker, presumably representing the Massachusetts Commission on Industrial and Technical Education, employed the term "industrial education" so narrowly that it was made to apply only to work given in special schools with the purpose of training for definite trades. Without questioning the right of the Commission to define the meaning of the term "industrial training" as used in its own reports, I would record a protest against the general acceptance of any such limitation. It was with the belief that a considerable amount of training, with definite vocational purpose could and should be included in the work of the elementary schools, that the experiment, which it is the main purpose of this article to describe, was undertaken. The discussion pertains only to this particular and limited phase of industrial education.

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Out of the chaos of ideas relating to the general subject, the careful student, who has especial interest in and experience with the work of the elementary grades, will discover five pertinent facts:

First. A large percentage of children (variously estimated at from 60 per cent. to 80 per cent.) leave school before completing the work of the elementary grades.

Second. While this is sometimes the result of stern necessity, it is often unquestionably due to the belief of parents and children that the training which is found outside the school is of greater industrial value to the pupils than that which is offered within.

Third. There is a demand for the industrial education of those who are to fill the *ranks* of the industrial army. This demand is threefold. It comes, as above hinted, from the parents, who will certainly continue to take their children from school in large numbers and at an early age it if is not met. It comes from the manufacturers, who are determined to secure more efficient workers. It comes from American ideals of general education which require *equal* educational opportunity for all—and that, we are beginning to understand, is a far different thing from *identical* education for all.

Fourth. Our present courses of study do little to meet this demand even where the average amount of attention is given to "manual training."

Fifth. In any industrial community such, for example, as the state of Massachusetts, *more than one-half* of the industrial workers are engaged in occupations for which it will be practically impossible, for years to come, to provide specific trade training. Such training is possible, or may be made possible for most of the workers in the building trades, for machinists, foundrymen, textile workers, shoemakers, etc., but cannot, without tremendous expense, be provided for the small and unclassified industries, which, however, give employment to a major portion of the industrial workers.

The above I believe to be facts. To these facts I will venture to add six opinions:

First. Unless industrial training is made a part of public instruction, and that speedily, it will be undertaken by the "business interests."

Second. The business interests can maintain "industrial education" with financial benefit to themselves as well as with the more obvious advantage to the children.

Third. Efforts made by the "business interests" to provide industrial education of any kind will have the distrust and the opposition of

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organized labor to a much greater extent than would similar efforts on the part of the public schools.

Fourth. In the long run, the "business interests" cannot be expected to conduct such education disinterestedly, and the children will receive far less benefit than they would receive in the public schools properly administered.

Fifth. A majority of the children now leaving school at the age of fourteen, would remain in school two or three years longer if the manual training work were so increased and so modified as to place the emphasis on vocational training.

Sixth. The school system of every city should offer, in some of its schools at least, for children of about 12 years, an "industrial course," only slightly differentiated from the regular course in other respects, but including a considerable amount of manual training with a vocational purpose, so modified that the school life of the pupils may be prolonged and their chances of industrial success enhanced.

It is apparent that each fact enumerated and each opinion expressed above might well serve as a thesis for an entire article, and the temptation to discuss them all is great. This temptation will be resisted, but it is no digression to note, in passing, one objection that will almost certainly be made to the last opinion expressed.

There are many who are today strongly advocating industrial training for our boys and girls, who maintain that our manual training does not contribute appreciably to the industrial efficiency of the pupils receiving it.

The report of the Massachusetts Commission on Industrial and Technical Education has played no small part in creating this impression. It expresses the opinion that manual training "has been urged as a cultural subject, mainly useful as a stimulus to other forms of intellectual effort—a sort of mustard relish, an appetizer, to be conducted without reference to any industrial end."

I so far disagree with the report as to believe that the manual training now given in the public schools has a real and considerable industrial value. This value has been overlooked partly because the amount of manual training given is insufficient to produce results commensurate with the great industrial need, but even more because the manual training which we have is seldom given to the pupils who later form the largest factor in the industrial problem, since they leave school, as above noted, before reaching the grades in which such training is provided. It is not the fault of our manual training that boys who

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have had the benefit of the complete elementary school course, and those who have taken the courses in manual training offered in our high schools, do not enter the ranks of the industrial army and there demonstrate the value of the training which they have received. Rather is it to the credit of such training that boys, who have had the benefit of it, are enabled to take other positions offering even greater opportunities for advancement, positions which are, nevertheless, in the broadest sense of the word, industrial, positions having to do not only with production but with distribution, accounting and advertising of the manufactured product.

The fault lies not primarily in the manual training, but in the short-sightedness of the earlier promoters of manual training, who established the work in the upper grades and in the high schools and then confidently predicted industrial results, which in the nature of the case were wholly impossible, and equally of those in authority today who seeing the industrial need, overlook the possibilities which lie in our present courses and, making no attempt to modify and adapt them to these needs, seek some wholly new and as yet untried expedient.

The foundation of an adequate industrial training must be laid in the public elementary schools by providing manual training of the right kind, in the right quantity, for the right pupils, and at the right time. It was for the purpose of gaining some practical experience relating to this subject that the Boston School Committee on May 6, 1907, passed the following order, namely: "That the Superintendent be authorized to designate one or more boys' elementary schools in which the course of study may be experimentally modified for the purpose of determining in what way these schools may become more effective in training pupils for industrial pursuits, while at the same time, maintaining their efficiency for preparation for high schools." In accordance therewith the Superintendent selected the Agassiz School, Jamaica Plain.

About a week before the close of school, copies of the following circular were distributed among the boys who were to be in grade VI during the coming year:

AGASSIZ SCHOOL.

JAMAICA PLAIN, MASS., JUNE, 1907.

An opportunity will be offered, next September, to fifty boys of grade VI in the Agassiz district, to enter a class in which the course of study is planned especially for boys who have an aptitude for industrial pursuits.

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This course will offer more manual training, shop arithmetic and working drawing, and at the same time maintain the efficiency of preparation for high schools.

If you wish your boy to join this class, please sign the following blank form, and return it to the master of the school.

As the number who can be accommodated in this course is limited, the earliest applications will be considered first.

This circular was signed by the principal and the director of drawing and manual training.

Before he left Boston, for his summer vacation, the principal of the school had received upwards of 50 applications for membership in the new industrial class, and in September the class, numbering 52 boys, was organized, and one of the most able and experienced of the regular corps of manual training teachers was put in charge. To her energetic and intelligent effort is due, in no small degree, the success with which the experiment has thus far been attended.

The class was divided into two sections of 25 boys each, and each section worked one hour of each school day.

In determining the nature of the work to be done, and in selecting the articles to be made, one fundamental principle has served as index and guide: Everything must conform as closely as possible to actual industrial work in real life. The product must be not only useful but must be needed, and must be put to actual use. It must be something which may be produced in quantities. The method must be practical, and both product and method must be subjected to the same commercial tests, as far as possible, as apply in actual industry.

For two years these boys had done the regular manual training work of grades IV and V, cardboard construction, so it was decided to begin the industrial work with box-making.

It was found that pasteboard boxes, costing ¾ of a cent each, were being used by the school department in sending out certain supplies, and the class undertook the manufacture of several hundred of these boxes.

The method employed was as follows: First a sample box was studied and careful note was taken of its use, of the material of which it was made, and of the details of its construction. Especial attention was called to the dimensions and to the need of obtaining accurate results in order that all boxes might serve the purpose for which they were intended and also be alike.

Each boy then made one entire box, drawing, cutting, scoring, gluing, staying corners, pasting.

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Next, by a briet talk, and with necessary demonstration, an explanation was given of the greater economy of employing "industrial methods."

Jigs were made for facilitating some of the operations and for securing greater uniformity in the product. The class was organized into different groups of from two to six boys each, each group performing one of the several operations involved in the making of the box or the cover. There were the box cutters, cover cutters, stayers, pasters, fitters, and gluers. There were those who assembled, inspected, packed and counted the boxes, and there were the assistant teachers—foremen in embryo.

Of course this was not all done in one lesson. By the time 750 of these boxes were made and packed ready for the supply team, the boys had gained at least a glimmer of light on five points of superiority of this, the industrial method, over the method first employed: First, that there was greater economy in the use of material. Second, that much time was saved, since it was not necessary to lay aside one tool and hunt for another at the completion of a single operation. Third, that the skill increased very rapidly by performing the same operation many times. Fourth, that a standard of accomplishment in a given time was established, below which no self-respecting boy wished to fall. Fifth, that a "good" box could not be produced if any of the group of boys did "bad" work.

In passing I must note and answer one objection which some advocates of "educational" manual training will make, namely, that the frequent repetition of the same movement is not educational since it becomes practically automatic—a matter of the spinal cord. Be that as it may, the boys show an ever increasing interest and delight in their work as they become more and more skilful, for there is a keen joy in mere accomplishment which is by no means a matter of the spinal cord, but of an intelligence which is much higher. It should also be noted in this connection that, from time to time the groups were changed so that, in the end, all the boys had performed several, if not all, of the different operations.

The second project was a box smaller and more finely constructed than the first. Sixteen hundred of these were made.

In speaking of the methods used in making the later projects it is only necessary to note two points in which they differed from those first employed: First, in the earlier project the groups were chosen

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with reference to the ability of individual boys and the difficulty of the several operations. In the later, the groups were formed by taking the boys in order, just as they came, and a "foreman" was appointed for each group.

Second. A system of "check" was introduced which made it possible to trace poor work to its author—thus fixing responsibility. After the completion of the second project some calculations were made to ascertain the increase of efficiency and it was found to be about 400 per cent.

Subsequent projects have been vellum-covered pencil boxes, for use in high school drawing classes, and "Harvard" covers of vellum with leather backs and corners. Of the former about 475, and of the latter about 800 were made.

This is a brief outline of the work thus far done. The time is taken from the manual training, drawing and arithmetic, but it is believed that little is lost. The boys are required to keep careful record of time, material and output and to make computations based thereon.

A spelling list of 60 words has already been sent to the regular teacher (an addition to the vocabulary of the boys), including the names of tools, materials and processes. The word "industrial" is one, and in it the boys are much interested.

In a two or three years' course, the manufacture of articles of other materials will undoubtedly be undertaken, and drawing, mechanical and freehand, will become a part of the work, as will also design. It is rather early to speak with certainty about the interest with which the boys will follow this work, but the indications are all extremely favorable. The boys do not seem to object to giving their work to the city, but rather appear to be pleased that they can contribute something to its support, and that, in these days, is of no small consequence. Interest seems to be awakened and held by the mere productive activity—by the industrial processes themselves, and it has not been necessary, thus far, to bring in the motive of ownership, which is prominent in the regular manual training work. The boys were interested when the supply team called to transfer their boxes to the supply roms. Some rivalry has been noted between different groups and some boys have asked to be allowed to work at home.

What are the results to be? Frankly this is an experiment and a very new one and we prefer not to predict results. It is hoped that

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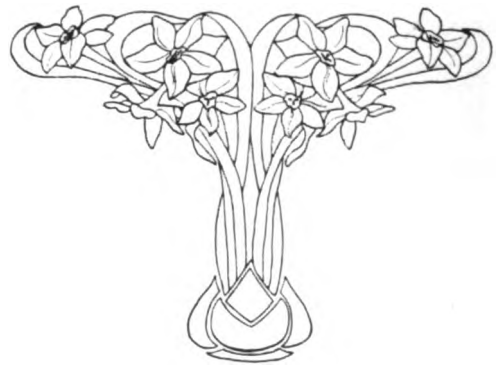
the training received will itself add something to the efficiency of the boys, but it is also hoped that it will so atract them to industrial pursuits that they will seek admission to more complete industrial courses which may be established later.

It is hoped that the experiment may demonstrate that the place to *begin* industrial training is in the public schools, and that in this way only can our schools be made truly democratic. Until very recently they have offered equal opportunity for all to receive *one kind* of education, but what will make them democratic is to provide opportunity for all to receive such education as will fit them *equally well* for their particular life work.

It is hoped that the experiment may show that differentiation should be made possible for our pupils before the end of the present elementary school course—as is indeed already the case in Boston with those boys and girls who elect a classical education. This need for an earlier differentiation is based on psychological as well as social reasons and is gaining wide recognition.

If the experiment at Jamaica Plain provokes discussion and induces others to seek, within the public school system, a solution of the problem of vocational training instead of handing it over to the business interests, at least one important result will have been achieved.



DRAWN BY E. E. SHEPPARD

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A COURSE OF STUDY IN MANUAL TRAINING.—IV.[1]

CHESHIRE LOWTON BOONE.

IT may be well to review concisely the reasons for using paper and cardboard construction and to state in what part of the elementary school such work will be of most service.

(a) After the rather free and unrestricted sand table exercises of the first two years, there should be taught in the third and fourth grades such things as will demand *accurate* construction and a good deal of planning by the children. They should learn to measure with skill and rapidity and to cut material with accuracy. The problems offered should permit of some decoration and should be *immediately useful*. Such things as desk pads, portfolios, simple booklets, calendars, envelopes and covers, are suitable. They involve the constant use of the ruler, a variety of processes, and the things when done are at once available for use.

(b) The reason for putting this work into the upper primary grades is, that children at that period show utilitarian leanings which should be satisfied with a material that is possible from the technical standpoint. Secondly, some decoration and lettering should be introduced as a foundation for the future shop and craft work. Thirdly, it is quite desirable that the rudiments of good workmanship and method be implanted early. The type of exercises, indicated in this paper seems to more nearly fulfill requirements than any other one kind, and the writer firmly believes it advisable to handle one class of problems long enough to achieve a degree of expertness.

(c) One finds in existing courses of study several forms of construction, materials and exercises, which are harmless enough in themselves, but have so narrow a range as to be not worth using. Basketry, to be distinguished, should be pursued by older (grammar) pupils. Weaving, as primary children must do it, means practically the making of small rugs. There is the possibility of a little design, but after the second rug the variety ends. Pottery-making also should come a little later to be most profitable. To get the most out of clay work, children should be old enough to appreciate the kind of design possible in and for clay and to devise forms and decorations for themselves.[2]

[1] Copyright, 1907, Cheshire L. Boone.

[2] Pottery will be the subject of the next paper.

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Aside from the condition that most constructed things should have a utilitarian *raison d'etre,* there is in all cases some desirable sequence of processes to be observed. Most of the things herein suggested are made of cardboard (strawboard) covered with cover or bogus paper or book-linen. Book-linen is difficult to fold, measure and paste; it should be used sparingly at first.

The first problem may be the making of a picture mount, calendar support or small blotter. The foundation is a rectangle of stiff cardboard covered with paper of good tone. The cards should be cut to size. Cover paper, in pieces large enough to complete the article, is given out with the card. The following are typical directions (to be illustrated by drawings on the blackboard):

(1) The sheet of cover paper must furnish two pieces, one about ¾″ larger each way than the card, and the second exactly the same size as the card (Plate I, A and B).

(2) Lay the given cardboard on the cover paper near a corner, leaving the proper margin, and trace around it. Measure the right-hand margin on the other two sides (dotted lines) and cut on them. This is the front cover (A).

(3) Lay the cardboard on corner of remaining piece of covering and trace around; cut on traced line. This is the back covering (B).

(4) Cut off corners of piece with margins so that cut does not quite touch the corners of tracing (C).

(5) Lay cardboard to fit the tracing, fold over the marginal laps and paste[1] these down. No paste is to be used on the inside of the covering (D).

(6) Cut off ¼″ from a side and an end of the back cover (B) to make it a very little smaller than the card and paste on the back. Use paste only on the edges[2].

These directions cover the fundamentals of covering and pasting. If the object is a calendar, some brace or other device may be added for keeping it upright on the table or for hanging.

DESK PAD.

The desk pad is made of cardboard about 9″ x 12″. This should be covered after the manner indicated above; in this respect it is the same problem as the calendar, but in large size. In addition there are

[1] Common library paste, flour paste or mucilage. The first is best to handle.

[2] It is suggested that large surfaces be not covered with paste. It is hard to accomplish without liquid paste and long brushes. For most purposes in the grades it is not necessary.

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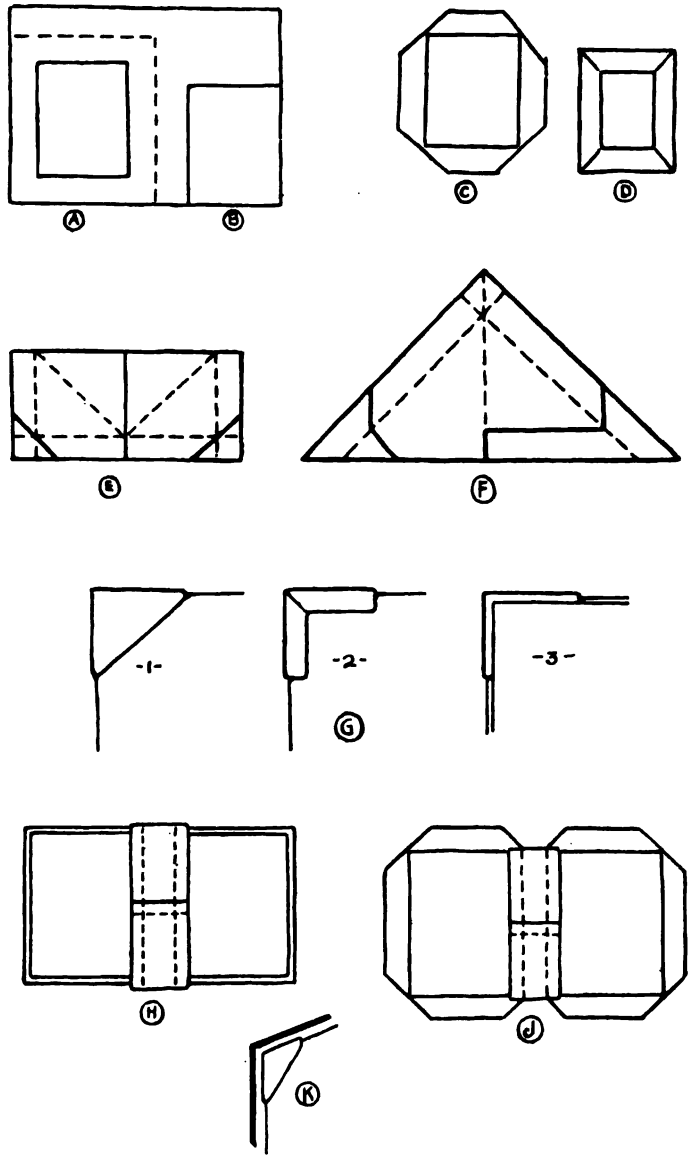

PLATE I.

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corners to be made to hold the blotter. These must be constructed so they will fit the corner of the pad snugly and not tear or come loose when the blotter is inserted. There are several types, of which these are the most useful for this and problems to follow. The first one (E), is simplest for the desk pads, since it is to be shown on one side only—the front. Although strong cover paper will do very well, this corner ought to be constructed of book linen for strength. It is made from a 3″ square, creased on two sides ½″ from the edge and along the diagonal of the new square made by the first folds. One corner is cut as shown by full line. Four such corners are needed for each pad. They are to be pasted on like this (G, 1 and 2). A better and more workmanlike way is to put on the corner *before* the back covering is attached, which piece then hides the flaps (G 3). The pad is completed by cutting a blotter, somewhat smaller than the pad and sticking it under the folded corner pockets.

PORTFOLIO.

The typical portfolio is made of two very stiff covered cardboards attached to a hinge of tough paper or book linen. The simplest construction is to cover the two halves separately as for the desk pad, and fasten together with a hinge wide enough to allow about 1″ between the boards and ½″ to paste on each edge, and long enough to fold over inside and meet to make a hinge of double thickness (H). The doted lines indicate unseen edges of board covers and show how much of the hinge is attached to sides.

There are innumerable varieties of this problem and related ones —sometimes the hinge is attached to the bare cardboards and the whole then covered. In such case each half should be covered separately to give the hinge full play. Covering would then be cut with margins on three sides, the fourth being pasted over the hinge and coming even with the edge of the cardboard (dotted line, J). The inside covering is pasted last.

If the article is to be used for writing materials, a blotter and pocket are desirable. The corner piece described (E) is suitable, but it must be attached to the inside lining, not pasted over the cardboard as in the desk pad. The pocket to hold paper and envelopes is also attached to the lining. The pocket piece is cut about 1½″ longer in width and length than the finished pocket (Plate II, L). Corners are cut out leaving four flaps. The inside lining for portfolio is then pasted to one of the end flaps (M), and to each of the side flaps is pasted

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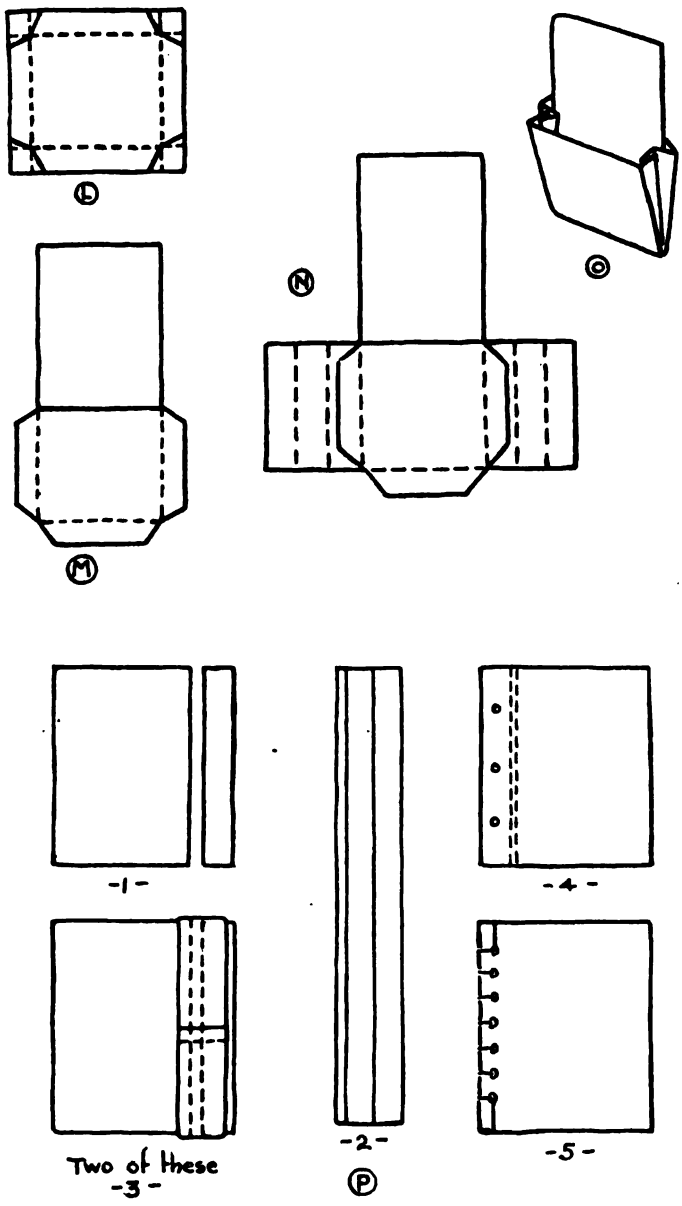

PLATE II.

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a three-fold hinge (N). The pocket is then folded up to the lining and the other end of the hinge pasted to the back of this lining (O). The whole is then ready to paste inside the portfolio. In some cases a double corner (Plate I, F or G), which looks the same both inside and out, is desirable as a decorative feature. A portfolio may have flaps inside to prevent loose papers from falling out. Such flaps should be made from single thicknesses of tough paper, preferably the same as cover material, and should be attached to the inside lining *before* it is pasted in. A more simple scheme and one which may be used in addition to flaps is to fasten cord or tape to the three open sides and tie the portfolios when closed.

A next step, which is really simple book making, is the manufacture of a portfolio or pamphlet tied at the back and with a separate hinge for each side of the cover. Each side consists of a narrow strip, wide enough to be punched for tying and the cover proper (P). The two sides of the cover are made separately and punched. The leaves or papers to be bound are then punched to correspond to the holes in the cover and are tied between the covers.

Other similar things like pencil cases, memorandum pads or books, autograph albums, card cases, calendars, needle books and innumerable variations of the portfolio or note book idea can be easily devised along the lines above suggested. The covering, hinges and corners may be so selected as to make pleasing combinations of tone.

Ample time should be used to make the things, that they may be durable. All dictated work is best done after drawings on the blackboard.

DESIGN.

None of the work, save the desk pad, is employed to advantage if design or decoration is not a part of the problem. Every portfolio should be for definite use. This purpose and the child's name or other information should be lettered on the outside. To make the lettering more effective and also hold the design together a simple border or decorative stamp may be included (Plate III).

The whole question of design and decoration for the problems here mentioned is one of use and necessity. Children in the intermediate grades are not able to do complex patterns or to deal with fine page or cover design. Their conception of the project must be a practical one and the teacher's statement of what is desired should include the necessary elements of decoration, together with as little of the purely

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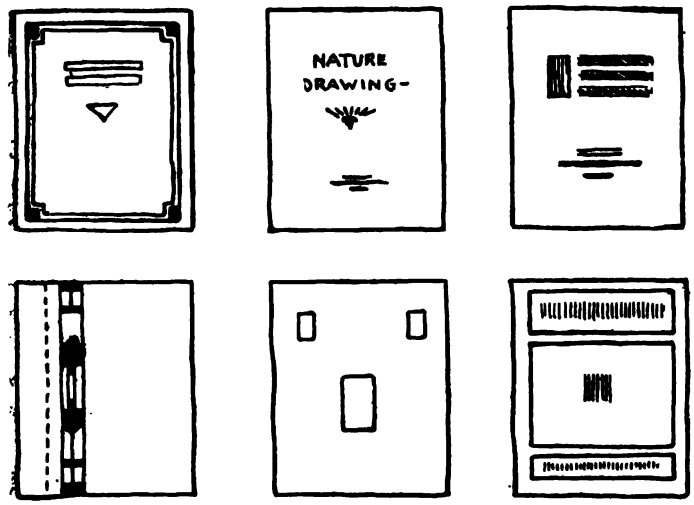
ornamental as possible. Much inspiration and help may be derived from the inspection of current book and magazine covers—the simplest ones. All lettering should be done with plain gothic capitals (Plate III). The title name, school, etc., should be arranged symmetrically on the cover with no attempt at unique composition. The title makes one group by itself and should be most prominent by virtue of its size or color. The color of both lettering and design (border) should be quiet, preferably of a tone similar to that of the cover, but darker in value. Water color must be used for this work; crayon rubs off and gives the work a messy appearance.



ABCDEFGHIJKLMNOPQRSTUV
WXYZ ••• & ••• 1234567890

PLATE III.

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A STUDY IN THE DEVELOPMENT OF TRANSPORTATION.[1]

WILLIAM R. WARD.

"The millenniums of change through which human invention has passed in the transforming of a rude stick or frame to fit on a man's back, or a burden strap to fit across his forehead, or a pad to rest on his head, into the latest devices for transportation by land or by sea, constitute one of the world's activities."—The Origins of Invention, by Otis T. Mason.

THE following statements briefly outlining the work done by a class of sixth grade boys and girls are not written for the purpose of justifying or discrediting any particular system of manual training, but rather to chronicle the actual work of a class in the hope that someone may find inspiration in the ideas suggested.

The subject of colonization was under discussion in the history class and since transportation bears such close relation to the general topic of colonization, it was decided by the manual training class to make a study of some of the phases in the development of the means of transportation. The general subject of transportation was divided into two parts—transportation by land and transportation by water. Transportation by land was the particular part of the general topic chosen for study.

Among some of the first questions that naturally suggested themselves were: When did transportation begin? What were the objects transported? What were the means by which this transportation was accomplished? Obviously transportation began when man first carried some article of food from the place where he had found it to his place of abode, either for his own future use or for the use of his mate. The object transported may have been some wild berries, some nuts, or perchance a small animal which he had killed; and his means of transportation were undoubtedly his hands.

[1]The problem described above was worked out with a class consisting of eleven girls and fourteen boys in the training department of the State Normal School of New Paltz, N. Y. The shop contained twenty benches. The present sixth grade is working upon a series of models showing the development of water transportation.

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Should we continue our investigations further, we should probably find man creating a shelter and slaying larger animals, and with this advance in his ability to cope with his environment comes a new problem. How is he to carry the fruits of his victory to his home, if "home" we may call it? Figure 1, a and b, suggests a simple "drag" or "sledge" which may have been used to transport for a short distance things

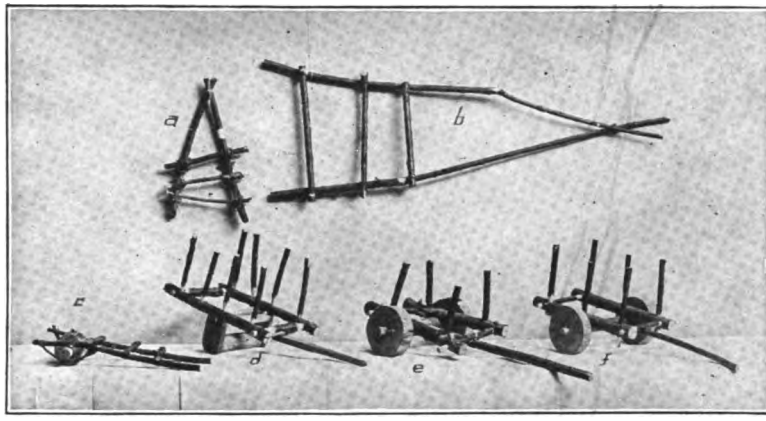

FIGURE 1.

which were too heavy to be carried. This "drag" consists of two poles on which has been constructed a platform by binding cross pieces to the poles with vines or roots.[1]

When man first learned to use the roller will probably never be known, but it must have been far back in prehistoric times. Figure 1, c and d are modifications of the use of the roller in transportation. This roller, the first step towards the wheel and axle, was at first probably a simple log tapered at the ends and held between crotched sticks. The present day wheel-barrow is a modification of this device.

While it is not the province of this article to show the causes for each succeeding device in the evolution of our present means of transportation or even to show why man came to discard the whole log as a roller and use only a cross section of it and thus employ the wheel and axle, yet it is not unlikely that he may have found it difficult to roll the log over obstructions like stones or stumps and have hit upon the idea of cutting away the center leaving only the ends the original size, or the necessity of using it between trees may have caused him to shorten

[1] The North American Indians used the device marked (b) in transporting their wigwams and other baggage from place to place.

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the log from time to time. The devices thus obtained may have suggested the cross-sections as wheels which were probably fastened to smaller logs as axles. In this device, regardless of the way it may have been determined, the axle revolved with the wheel. Later the axle was

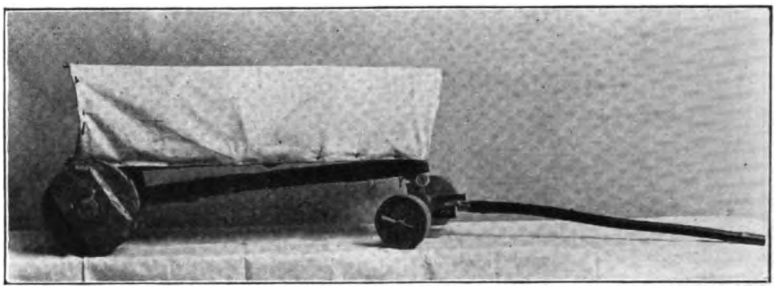

FIGURE 2.

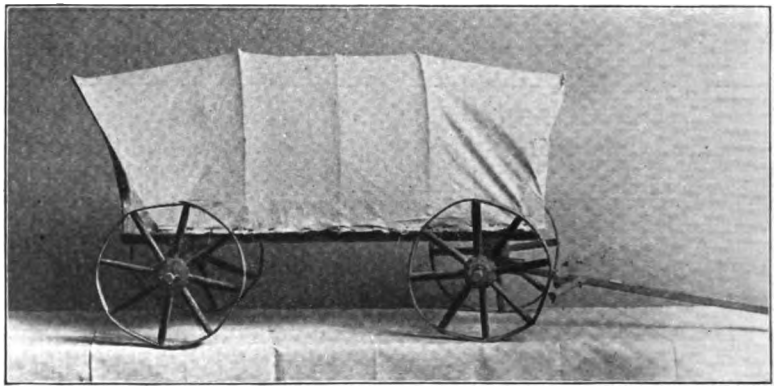

FIGURE 3.

held fast, the wheels only turning. Figure 1, e and f, are devices of the latter kind.

Figure 2 shows a four-wheeled vehicle but the wheels are still cross-sections of a log, while Figure 3 shows a wagon the wheels of which are made by using the hub, spokes, etc. The progress in development here represented is shown in the construction of the wheel. The spoked wheel however was undoubtedly used long before the four-wheeled wagon was invented.[3]

[3]International Encyclopedia.

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Figure 4 shows one of the highest types of modern mears of transportation—the freight car.

At least two methods of class instruction are presented by a problem such as is here suggested, namely, the individual and the group model. The "drags" and "rollers" shown in Figure 1 were constructed by individuals, the small carts by two pupils working together and the

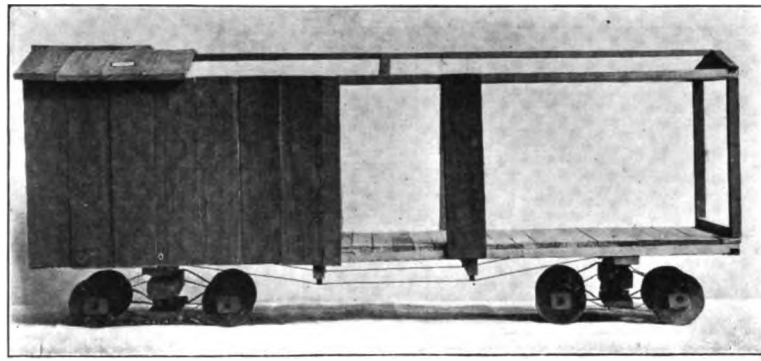

FIGURE 4.

wagon, with spoked wheels by four pupils, while the freight car was made by a group of at least ten.

Many problems of the industrial world were met and discussed. The four boys working on the wagon being unable to agree about some detail of its construction declared a strike and refused to work together. The instructor immediately became the committee of arbitration, heard the statements of opposing parties, adjusted the differences and set the machinery in motion again. The construction of the car gave opportunity for a division of labor. Four pupils made the trucks, two prepared the timbers for the frame work, and two framed and put them together, while others made the siding, floor, or roof.

Problems in mechanics were found at every turn. One example will serve as an illustration. In studying the freight cars at the railroad station, the trusses under the car attracted especial attention and called forth many inquiries. After their name had been given the question arose as to their purpose. A simple experiment like the one shown in Figure 5 soon cleared the matter up and many places where the truss is used were called to mind and given by different pupils.

Working sketches of some of the models were made by pupils before starting their problem and further completed as the work pro-

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gressed. A simple working drawing of the car was made by the teacher after the proportions had been determined by pupils who had previously measured one of the freight cars at the railroad station.

Projects of this kind do not call for accuracy of construction and hence aid only incidentally in acquiring skill or technique, nevertheless every cart, wagon or car may be made workable or complete in itself.

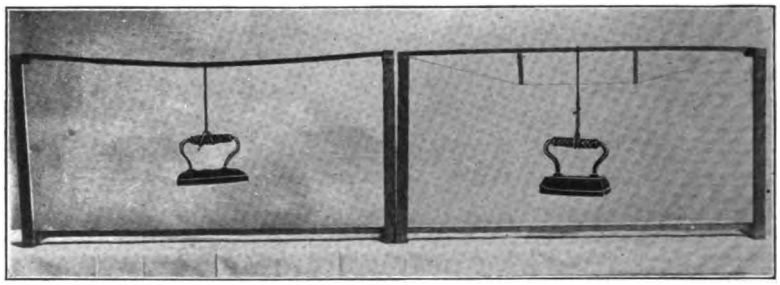

FIGURE 5.

Couple this fact with the thought content of the subject and it will be readily seen that every pupil has gained in power to think and to do.

Many teachers of manual training undoubtedly refrain from a study of this kind because of the increased difficulty of conducting a class which is allowed to work along such original lines, for it cannot be denied that it is much more difficult to manage a class under these circumstances than when they are working upon the individual model, but as Prof. Charles R. Richards has so well said, "what is impracticable today is accomplished tomorrow." Moreover is it not true that when the child is given a large measure of freedom he gets the opportunity to exercise his originality—that quality of the individual which we so much desire to develop?

The interest and enthusiasm shown by members of the class in examining works of reference for illustrations and descriptions of primitive carts as well as their eagerness to observe and to report concerning different types of freight cars would convince the most skeptical of the value of a study of this kind.

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COPING SAW WORK.[1]

BEN WILEY JOHNSON.

SOME three years ago the need arose in the fourth grade for a more vigorous and adaptable form of handwork than the use of raffia. As the children of this grade based much of their work upon local geography, history, and the development of native industries, of which lumbering is chief, the use of thin wood with simple tools was suggested.

We had seen children of this age use a coping saw sucessfully in Miss Langley's classes at the School of Education, Chicago University, and in Mr. W. J. Standley's work in the Y. M. C. A. day classes, at Portland, Oregon. Our problem was to devise a suitable equipment for the regular teacher to use with forty-eight children in the ordinary classroom, and a course of work, teachable in her inexperienced hands, of real merit, educationally, in the development of the child. After experimenting a term or two in different schools, the following equipment and course was devised. The unusual interest and delight of the children in this work, together with the success of the teacher in presenting it, led to its adoption for all the fourth-grade rooms in the city, about fifty in number.

[1] Copyright, 1908, by B. W. Johnson.

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There is much similarity in this work to that of the Eva Rodhe System, first taught in the *Praktiska Arbetsskola* in Gothenburg in 1891. The use of a fret or coping saw for most of the cutting, the use of a pattern or template laid on the thin wood by the child and marked around, and the use of toys for models are points in common. The

CHEST FOR HOLDING EQUIPMENT.

course followed here, however, requires many less tools, is used in an ordinary school room of forty-eight pupils and not in a specially equipped shop with only fifteen or twenty pupils, as in Gotherburg, also less consideration is given to the sequence of model and tools and for mechanical and geometrical accuracy.

The equipment consists of 48 coping saws, 48 saw tables, 48 iron clamps, 2″, to hold the table on the desk, 12 small tack hammers, 12 half-round cabinet files, 12 eagle compasses No. 576, 12 Sloyd knives, 6 Stanley try squares, 4″½, 6 brad awls $\frac{1}{16}$″, and 1 pair of Bernard's cutting pliers. For supplies the following is required: Wire brads ⅜″ and ½″ No. 20, liquid glue ½ pint, soft iron wire No. 16, sand paper No. 1, cottonwood boards ⅛″ x 6″ x 12″. Cottonwood is used because the cheapest available wood for this purpose. Bass and yellow poplar would be better, having less stringy fibre.

This equipment is kept in a chest 13½″ x 18″ x 30″, that rolls easily on casters. The saws and clamps are kept in 6 tray-like boxes,

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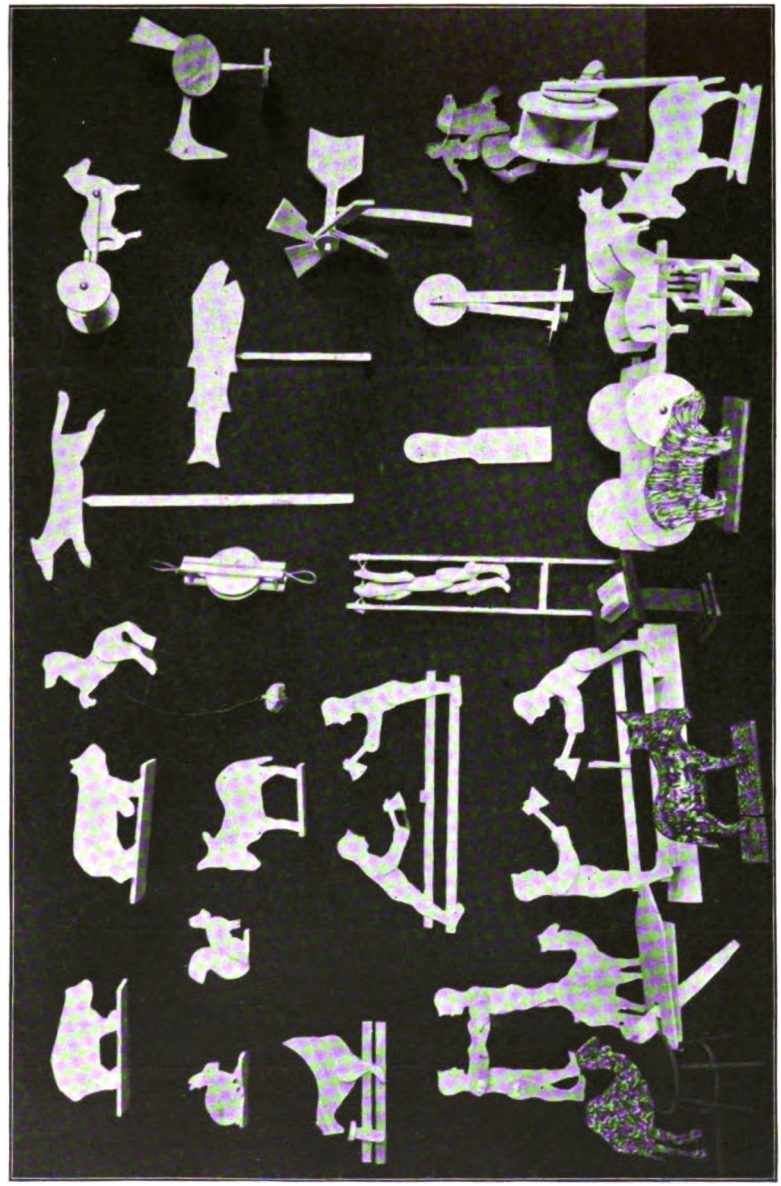

COPING SAW WORK—FOURTH GRADE, SEATTLE, WASH.

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COPING SAW WORK.—Seattle Public Schools.

Group	TO TEACH	MEANS. CLASS EXERCISE	PROBLEMS, SUGGES PLAY.	HOME.
I.	The Tools, their care. Saw, why it cuts, etc. Pencil, Ruler, Patterns. Laying out work, economy of material, grain of wood, its strength. File. Sandpaper—kinds to use on a block. Try-square, Knife, Hammer— how to use.	1. Saw out animal forms. Bear. (Have pupils understand what they make.	2 and 3. (The pupil to select any tw to make. Cougar. Rabbit. Squirrel. Donkey.	
		4. Stand. (Keep corners square.)	5. Make different kinds to suit anim vise a new support.	
II.	Construction. "Putting together." Awl—its use. Brads — sizes. Glue — what it is, why it holds.	6. Balancing Horse. (Why he balances. Physical law—explain ships, icebergs, circus rider, etc.)		
		7. Horse and Cart. (Class direction in making wagon.)	7a. Optionals: Four-wheeled Cart.	
III.	Construction. Movable parts—mechanical motions.	8. Feeding Chicken.	9. Wood-choppers, or Wrestlers.	(Egg crates, fr work. Encou
		10. "Dinkey Bird."	10a. Optionals: Athlete. (Figures may be painted with water co	
IV.	Construction. Accurate adjustment.	11. Pencil Sharpener. (Require accurate drawing and measurements.)		12. Calendar or Strike.
		13. Toy Furniture. Bench. Tables, Chairs, Cradles, etc.	(For design, consider with the class tl Different pieces may be made by	

Note: Other problems may be added by teacher or pupil if suitable to the group. The pupil should always progress in his choosing.

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COPING SAW WORK.—Seattle Public Schools.

APPLICATION IN CONSTRUCTIVE PROBLEMS

FOR INDIVIDUAL SELECTION		MATERIALS	DRAWING REQUIRED
SCHOOL	INDUSTRY		
r bring from home patterns or pictures of others		Cottonwood. Kind of tree, its use. Leaf and branch, may be drawn. Sandpaper.	Use a large drawing to show just how to place the pattern on wood.
Puzzle Maps or Pictures.			
made using scraps of wood. See who can de-		Cottonwood. Where does it grow?	Large drawing—pupils to copy by dictation on paper, then on the board.
	6a. Pulleys. Weather-vanes (optional).	Cottonwood. Brads, 3/8" No. 20. Iron Wire, No. 16. Small Stone.	Large drawing to show the "lay out." Patterns used.
	Wind-wheels. Conveyor. Light House.	Cottonwood. Brass Tacks.	Large drawing of cart. Pupils work from it by directions. Show how to "lay out."
and cigar boxes make good material for home e home work.)		Cottonwood or Cigar Box Wood (red cedar).	Large drawing of supports. Patterns for figures.
.)	Scales.	Cottonwood.	Large drawing of parts—patterns as indicated.
tch		Cottonwood or Cedar or Spruce.	Large drawing. Pupils copy.
proportions of real furniture and reduce in size. ferent children.)		Cottonwood or Cedar or Spruce.	Large drawing. Pupils copy.

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and these with the saw tables can be distributed by the six monitors in less than two minutes and the whole room be at work in less than five minutes. The cost of the outfit complete is about $35.

One period of sixty minutes per week is given for this work. The children ask for more time and many of them buy their own saws with a dozen blades for twenty-five cents at any hardware store, and make many interesting forms at home, using material taken from empty cigar, fruit and grocery boxes picked up at the corner grocery. Home work of this sort is encouraged by having such work exhibited for the other pupils to see and comment upon.

The course followed is shown in the diagram. The purpose of the work here, as in all other grades and forms of handwork, is to give educational direction to the child's natural constructive tendencies by using forms that are of interest to the pupil, and taken from his play, home, school and the industrial life about him.

The effort is made to have the forms chosen come to the pupil as *problems in construction to be solved by him,* and in the solution of which he will acquire skill, the power to create, and a growing appreciation of the constructive work in the world about him. The skillful teacher will relate this work to the other school subjects whenever practicable and teach the elements of good form and proportion, the need of drawing, the written language of form, the value of number in accurate application, and develop an awakening interest in the industries that are founded on these materials and processes. In fact, this last may easily be the leading avenue of approach in placing this subject in the curriculum.

Referring to the diagram the first column indicates in outline what we are to teach. The tools and some skill in their use and a knowledge of the limitations of the material are pre-requisite to any individual power of expression or creation. For the sake of analysis, the tools and the processes are grouped, and the sequence largely based on the idea of construction rather than on tool dexterity. The tools are few and are quickly mastered, but the possibilities in form and combinations of parts keeps the child mentally alert to solve the mechanical problems that come to him. As we have to deal with classes, and the same knowledge about the tools and the correct processes is necessary to every child, the means (given in the next column) used to convey this knowledge is a class model which all the children make under the careful supervision of the teacher to see that every child is forming the right habit in the

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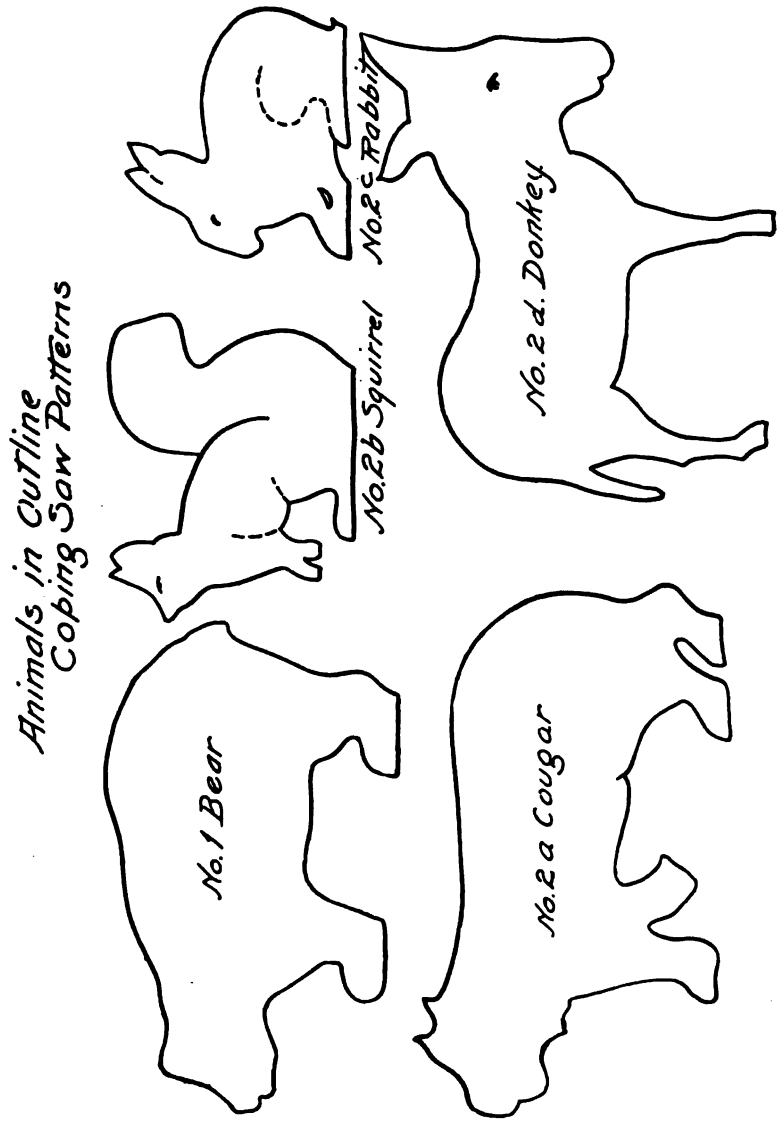

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use of the tools, and understands what he is doing and why he does it.

The next step and a very important one, and the basis, I believe, of any sucessful method of education, is to give the child an opportunity to work out individually his newly acquired ideas in a field of choice as free as conditions will permit. He now faces a new situation. He must determine how to meet it. It is this repeated experience in the course that will aid in developing his power of initiative, and begin to form a habit of successful attack. Such a habit may even have a moral significance in the other experiences of life, though seemingly not related to this one technical experience.

To accomplish this, problems for individual selection are given as shown in the diagram. To aid the teacher and pupil, these problems are divided or grouped according to their dominant interest as well as according to their mechanical and technical difficulty. No attempt is made to "split hairs" in this anaylsis, but such problems are selected as will emphasize what the child should know and also tax his ability in applying it as far as he has been taught in the process. That we may not forget the child, the four dominant interests—play, home, school and industry interests, that actuate us all in anything we do, are given and the problems arranged under each according to which one it seems to serve best. Naturally in the fourth grade the play interest is dominant. But we must see to it that the others are not forgotten for the sake of the man and woman of tomorrow.

The remaining two colunms, as indicated, help the teacher in the choice of material and its use, and to know what drawing should be presented and executed.

These problems for individual selection may be changed, or others added or substituted by both teacher and pupil, provided they are suitable to the group in which they are placed. Thus the teacher is free to make the course meet local conditions and carry out her own initiative, untrammeled by a series of set models. Her only limitations are those imposed by her lack of skill, the requirements of the material and the best accepted processes used to embody the idea in that material.

This plan also permits the bright pupil to work to full capacity unchecked by the dullest pupil and gives the slow pupil as much opportunity as he can use; for as soon as a pupil finishes the class piece he goes to work at once upon the problem of his choice. If he is bright and capable, wise advice will lead him to select a problem well worth his ability. In fact, he may make several pieces before the class as a

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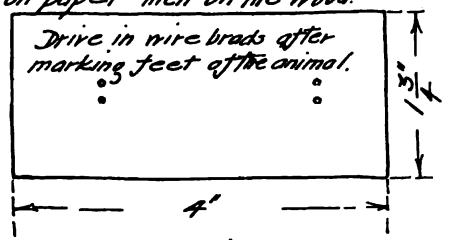
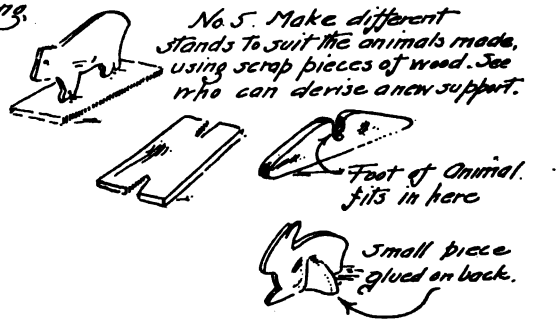
Coping Saw Patterns

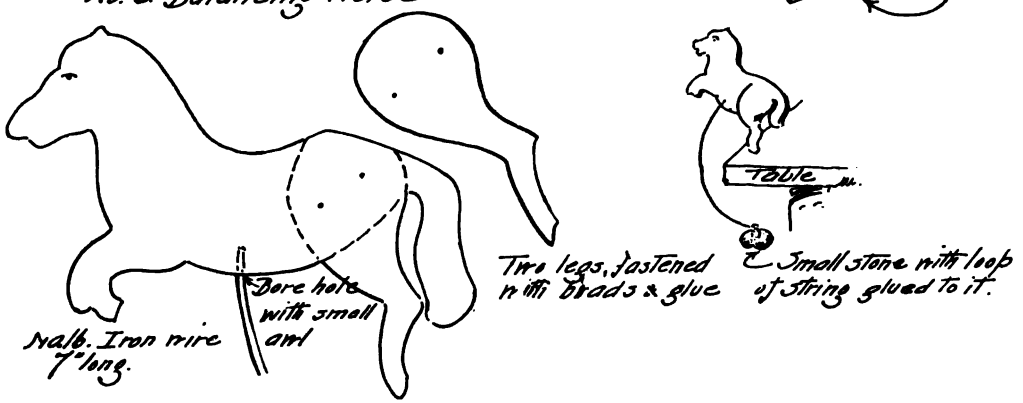
No. 4. Stand.
Have the pupil draw from large drawing, first on paper then on the wood.



No. 5. Make different stands to suit the animals made, using scrap pieces of wood. See who can devise a new support.



No. 6 Balancing Horse


Bore hole with small awl
Nail. Iron wire 7" long.
Two legs, fastened with brads & glue
Table
Small stone with loop of string glued to it.

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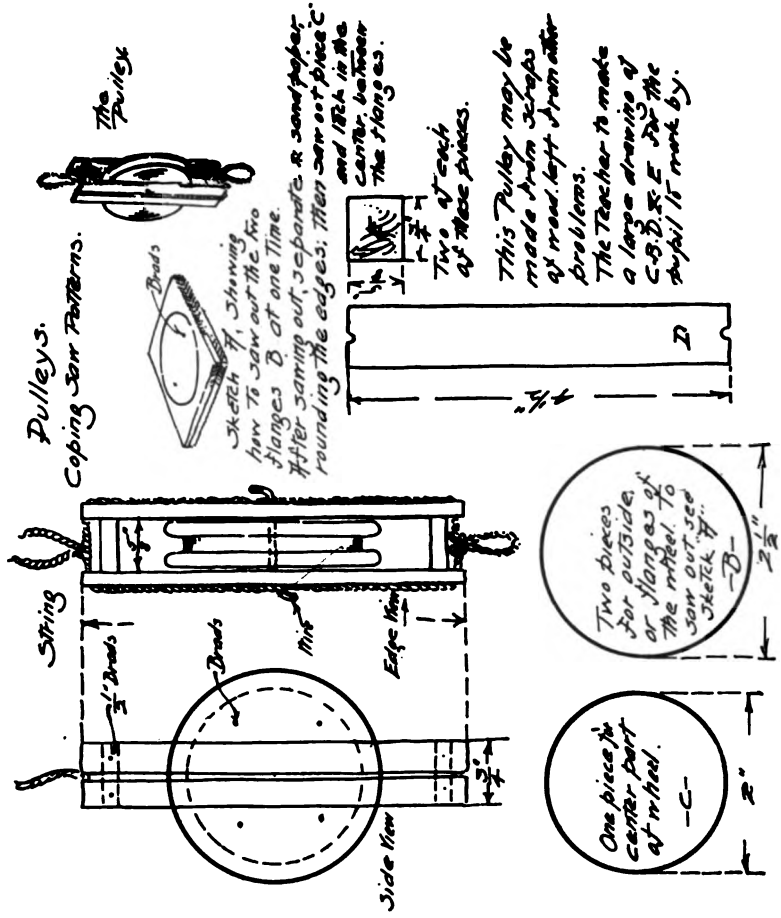
The Pulley
Pulleys.
Coping Saw Patterns.
Sketch A, showing how to saw out the two flanges B at one time.
After sawing out, separate & sandpaper rounding the edges; then saw out piece C and it is the center, between the flanges.
Two of each of these pieces.
This Pulley may be made from scraps of wood left from other problems.
The Teacher to make a large drawing of C.B.D. & E so the pupil is not mark by.
String
Brads
Brads
Edge View
Side View
Two pieces for outside or flanges of the wheel. To saw out see Sketch A.
One piece for center part of wheel.

whole is ready to take up the next step together in the next class exercise.

The sequence followed is indicated by the figures. This sequence is not one of technique solely, but of a constructive idea that passes from simple forms to more complicated expressions, and the process is a means to this end.

The writer fully appreciates the difficulties of this plan of presenting many models that may be made compared with giving a sequence

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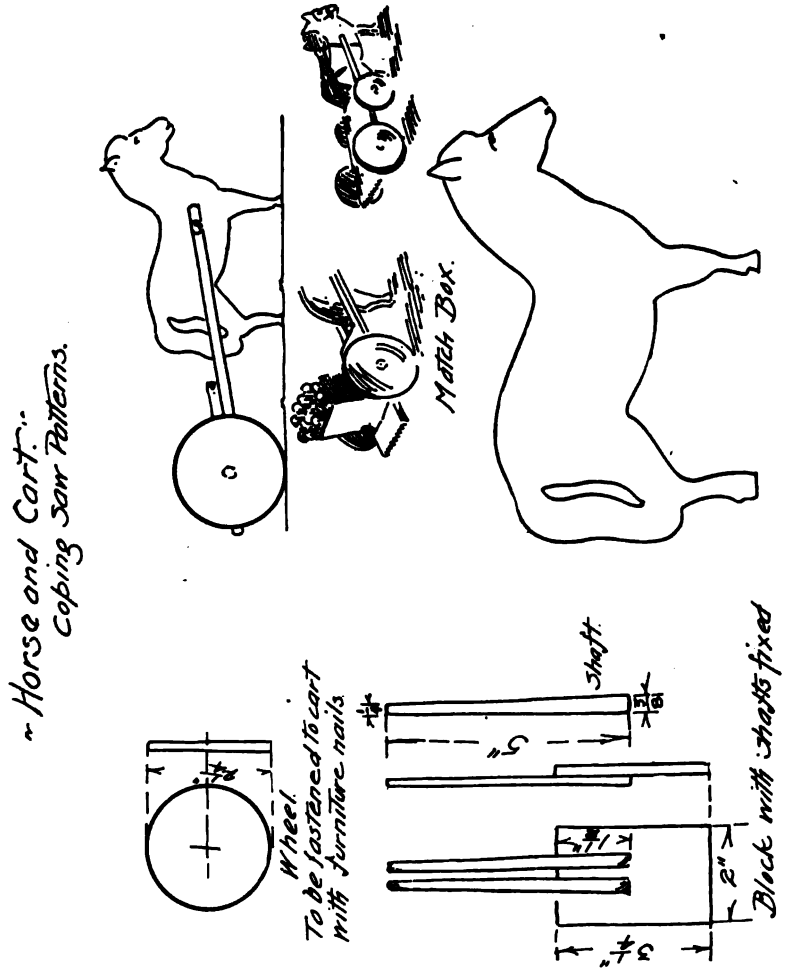

of eight, ten or twelve models to be carefully followed. The limits of this paper do not permit of further detail concerning the way the point of view and methods of work are given to the teachers. The few of the teachers who do not for one reason or another get hold of this plan do no worse than under the old formal lock-step method, and many who do succeed with it are able to accomplish much more than formerly, both in the amount and quality of the work, as well as in developing a greater interest and power on the part of the pupil.

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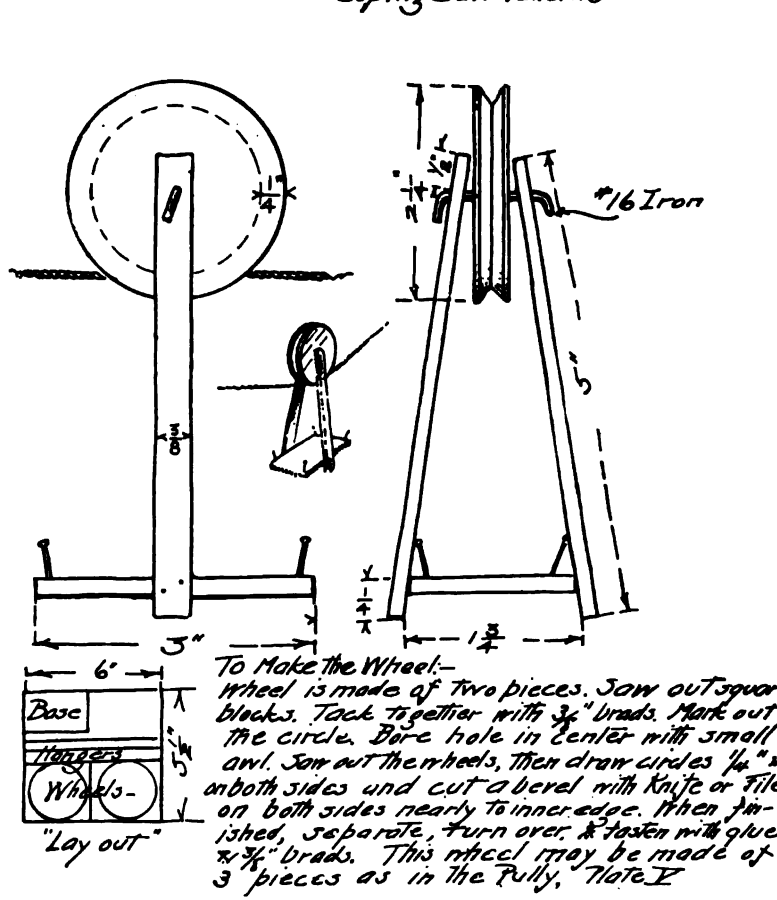
Conveyor
Coping Saw Patterns
#16 Iron
3"
6"
Base
Hangers
Wheels
"Lay out"
To Make the Wheel:-
Wheel is made of two pieces. Saw out square blocks. Tack together with 3/4" brads. Mark out the circle. Bore hole in center with small awl. Saw out the wheels, then draw circles 1/4" in on both sides and cut a bevel with Knife or File on both sides nearly to inner edge. When finished, separate, turn over & fasten with glue. & 3/4" brads. This wheel may be made of 3 pieces as in the Pully, Plate I

This diagram course is the "chart" for the teacher "to steer by." The necessary direction for making these models is given by means of hectograph sketches, some of which are here illustrated, and by monthly meetings with the teachers.

The amount of interest a child may take in any activity is not always a sure indication of its success, as an educational means. But interest is the key that unlocks the world, and the line of greatest effort

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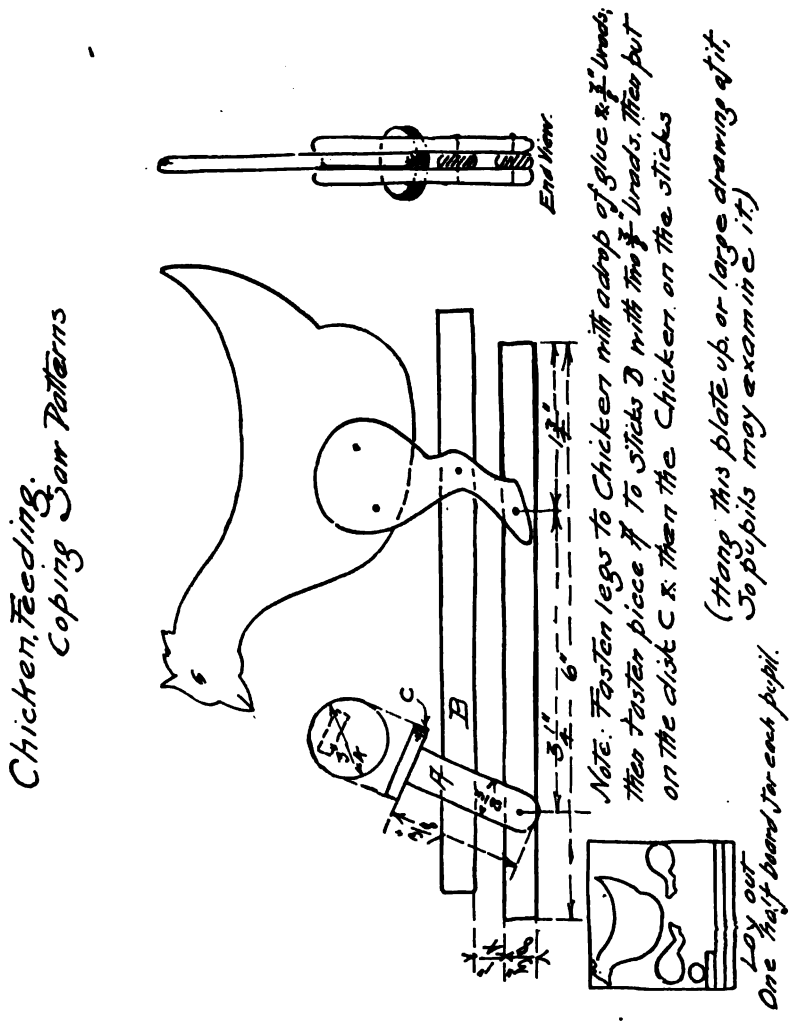
Chicken Feeding.
Coping Saw Patterns
End View.
Note: Fasten legs to Chicken with a drop of glue & 1" brads; then fasten piece A to sticks B with two 1" brads. Then put on the slot C & then the Chicken on the sticks
(Hang this plate up or large drawing of it. So pupils may examine it.)
Lay out
One half board for each pupil.

is that of deepest interest. The touchstone to life comes when the self-conscious mind perceives that interest awakened in one line, in the last analysis, touches all others, and that we may interest ourselves in any good thing we wish to.

That the children, girls and boys alike, are interested one or two instances will illustrate: In the mid-year a room lost its regular teacher and a substitute took her place for the balance of the term. The cop-

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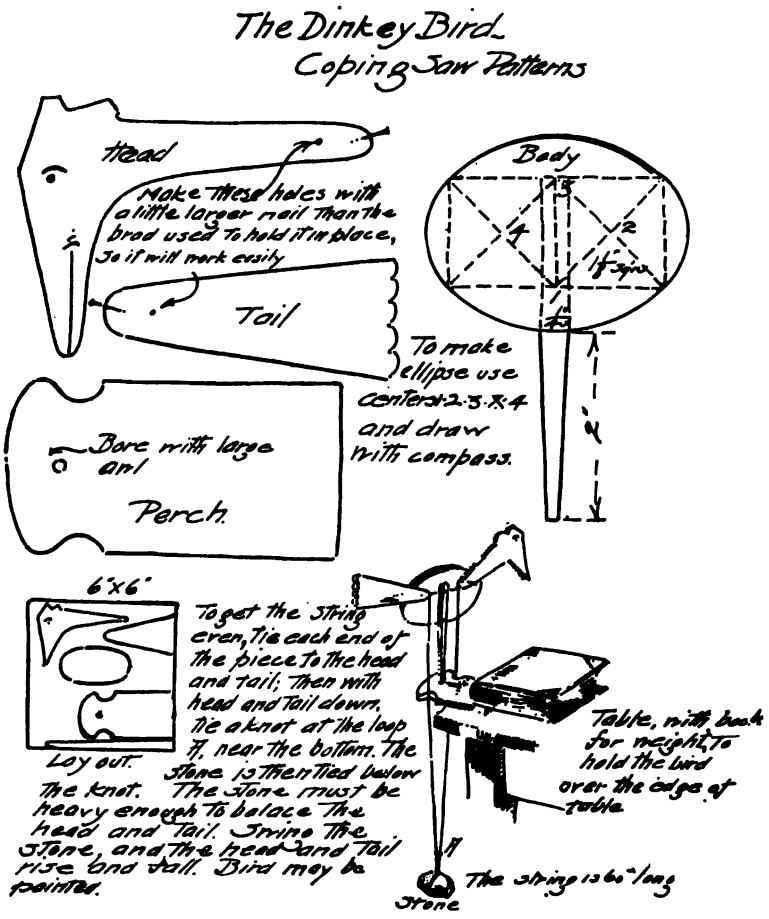
The Dinkey Bird
Coping Saw Patterns
Head
Make these holes with a little larger nail than the brad used to hold it in place, so it will work easily
Tail
Body
To make ellipse use centers 1.2.3.4 and draw with compass.
Bore with large awl
Perch
6"x6"
Lay out.
To get the string even, tie each end of the piece to the head and tail. Then with head and tail down, tie a knot at the loop if near the bottom. The stone is then tied below the knot. The stone must be heavy enough to balance the head and tail. Spring the stone, and the head and tail rise and fall. Bird may be painted.
Table, with back for weight, to hold the bird over the edge of table
The string is 60" long
Stone

ing saw lesson came a day or so later, before she could find out what and how to carry on the work of her predecessor, so she frankly told the children they would omit the lesson for that week. They protested, assuring her they could manage it all right and show her what to do. She was wise and anxious to learn from any source, so the hour went off with everyone very busy—profitable to all concerned.

In another school meritorious conduct and attendance is rewarded

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by stars conspicuously placed, and when thirteen unbroken spots are covered they get a half holiday Friday. It happened the particular Friday was particular in other ways, and they would miss their coping saw hour, so they voted to spend the holiday in school sawing wood.

The soul satisfying cry, "it works," the cry that opens the way to still greater accomplishment, startled a principal in her office, the other morning, as a small boy rushed in, face and eyes shining and held towards her his "athlete" that would "perform" as he had made it to do. There is great value in some of our school work having a standard of excellence that even a small boy can appreciate.

In conclusion the writer claims no originality for this work other than its adaptation to this situation. Most of the models used and the methods of the course and its analysis are the result of observations made of what others have done along similar lines. It is not the end, but only a beginning.

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AN APPRECIATION OF CARDBOARD CONSTRUCTION.

JOHN C. BRODHEAD.

A FEW years ago the writer assisted in collating facts regarding manual training, obtained from superintendents of large school systems. It was noticeable how few cities had any form of organized hand work in the lower grades. Doubtless most of these cities were well supplied with kindergartens, their merit being everywhere conceded, and the reports showed that in the upper grades, and in regular and special high schools, manual work was either being given the same place as other work or was to be inaugurated very shortly, or else regret was expressed that circumstances prevented its adoption. Little comment was made upon the lack in the lower grades and one is led to question why a subject so appreciated in kindergarten, upper grades and high schools, should be so calmly ignored in the lower grades, especially when we consider that the motor instincts are strongest and most susceptible of training in these very grades, and that, in many instances, our pupils leave school before reaching the grades in which woodworking is offered. The answer to this question would seem to be that school authorities, generally, feel that it is impossible to afford expensive equipment and materials and special instruction in the numerous classes of the lower grades, and that there is no form of manual training, of educative character, suitable to these grades which does not require such expense.

Most of us know, and all should know, of the interesting work done throughout the grades in such schools as the Horace Mann of Teachers College, and the School of Education, Chicago University. Their work has been described in these pages again and again. But its variety, and a knowledge of the conditions under which it is produced, may sometimes discourage rather than encourage the superintendent as he goes back to his classes of fifty children so often taught by overworked and underpaid teachers. Therefore because modeling is thought to be too dirty; basketry, too expensive; weaving, too individual for class work, etc., and because all these lines of endeavor are supposed to require the services of special teachers, I shall come at once to the line of work mentioned in the title of this paper and attempt to show how cardboard construction is adapted for introduction in the lower grades.

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Most superintendents or supervisors of the manual arts, in looking over the various text-books of cardboard work, will concede that the subject can be taught to large classes by the regular teachers and with a small outlay for materials and equipment. The patience of the children is not taxed, and noise and dirt are practically eliminated. The objection, when any is raised, seems to be that the time spent in drawing and cutting out forms at the dictation of a teacher is not educative enough to warrant the expenditure of time. It is this objection that it is the purpose of this paper to meet, in the hope that more schools may introduce such a valuable line of manual training when they cannot carry on still better but much more expensive lines of work. Even if the choice were to lie between no manual training and cardboard work at its worst, I should still recommend its introduction in the lower grades. The facility gained, in such work, in the use of scissors, compasses, triangles, and especially the rule, is of great value. It is difficult to induce a boy in the seventh grade to listen attentively to instructions in the use of the rule. However ignorant of it he may be, he is "above" studying it. In the fourth grade, however, this same rule is still enough of a mystery so that he is willing to take it seriously and really become intelligently acquainted witih it.

Most any of the many excellent text-books on the market may be used successfully by the thoughtful teacher. The chief criticism that can be made of them is that there is lacking in them the elements of individuality in work, change of methods of instruction as pupils advance, opportunity for design, etc. The writer will endeavor to make some very practical suggestions in the hope that they may be taken right into the classroom and used with any text-book to breathe new life into the work.

Upon the manner in which the lessons are conducted depends the value of the work and attention is called to the following suggestions as to how the work may prove broad, interesting, educative and of industrial value, not as leading directly to a trade, although it could do that, but as imparting an interest in construction and things mechanical.

Begin the formal work in the fourth grade preceded, if possible, by paper folding and cutting, tablet laying, etc., in the first three grades, but the latter is not essential.

A year's work with a class of fifty requires about 150 sheets of bristol board and four balls of twine or six tubes of paste, according to the grade, at a total cost of about $2.00 for the class. One equipment of 8 punches, and 4 dozen each of scissors, triangles, compass attachments, and rules, will serve several classes and cost about $25.00.

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At the outset the teacher should appreciate and, whenever opportunity offers, point out to the children the relation between cardboard work and the industries of the world. Such a relationship is quickly seen in the case of sloyd or manual training in wood in connection with house building, pattern making, furniture construction and cabinet-making. In the same way it should be noted that cardboard construction can be made illustrative of many of the uses of sheet materials. In the case of tinsmithing, cornice and ventilating work, steel frame, bridge and elevated railway construction, the units are always formed from flat sheets, sometimes very thin, getting their ultimate strength from being shaped by bending or flanging in various ways. All this can be illustrated with cardboard, either by having angle irons, I-beams, channel irons, etc. imitated directly or incidently as other work progresses. The methods of paper making might be described, and mention made of the part they play, in causing us to cut with the grain, the strips of cardboard for the napkin ring, circular box, etc.

Naturally drawing plays a large part in cardboard construction, and its difficulty, as each model is laid out, increases only with the difficulty of the model, which is not true in woodworking where the drawing of an object may be very simple but its construction very difficult. At first one must be satisfied with the following of dictation, being sure that the dictation is logical and clear and that the following is exact. The drawing, to scale, should be put on the board exactly as the children are expected to work, one line at a time in their presence, putting on dimensions with proper conventions, these not to appear on the cardboard. The board ruler should be graduated to inches, halves and quarters.

While not teaching formal definitions, care should be taken that correct terms are used by teacher and pupils and that the qualities of the various forms are recognized. A few moments should be spent, during each drawing lesson, in reviewing the various forms revealed by the construction lines of the current problem.

There may here be introduced simple work in design, such as the application of borders to candle shades, and trays, or of panelling to screens. etc.

After a few weeks, the method of instruction should occasionally call for the making, by the pupil, of a working drawing on paper with all dimensions properly added, following the work of the teacher at the board. The models should then be made of cardboard, with but little direction, the board work having been erased and the pupils working from their own drawings.

Right here a word about accuracy—that bug-a-bear of the conscientious teacher. Accuracy is all a question of relativity. No one of us can cut out a piece of cardboard exactly 6″ square. All that should be attempted with the children is to raise their standard of accuracy. This can more effectively be done by the demands of the work than by any amount of preaching or scolding. That is, a tag ⅛″ too long does not offend a pupil, but a tray, one of whose sides is ⅛″ higher than the other at the corner, will offend him and he will try to avoid such results in the future; that is, his standard of accuracy has been raised.

In connection with the tying up of models, a few simple knots should be taught, especially the square and bow knots. About one person in ten knows

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a square knot from a "granny" and only one in one hundred can tie one the first time. Very few boys can tie a bow knot. These and other knots can be taught with great interest and no equipment.

About at this stage, thoughtful work is induced by having pupils design and make working drawings for mounts for pictures, brought in by themselves, or develop envelopes to contain cards of stated dimensions.

Note the variety of thought in carrying out a lesson about as follows: Display a pasteboard box, such as pencils come in, with its cover. Have a few children at the board, and the rest at their seats, make sketches of the developments adding laps and dimensions of all parts. Then have over-all dimensions figured and area and contents of box, if possible. The box should then be made from cardboard. When this can be done without constant leading questions on the part of the teacher, much progress has been made.

By this time more design can be employed in the modification of the outline of parts of models such as backs of match scratchers, calendar mounts, etc., and sides of square, hexagonal and octagonal trays, taboret models, etc. The best way to secure good results in this contour design, and to eliminate tediousness, is to have the experimentation done with paper cutting, the best resulting design to be traced upon the cardboard model.

An exercise which would demand the employment of all varieties of previously outlined methods would be to ask the pupils each to design an octagonal tray not to exceed say 6″ in diameter, sides to be made of pleasing proportions and contour, and to put an appropriate design in the centre of the tray or on the sides. Method of fastening sides, (tying, lacing or pasting) to be left to pupils' initiative. Preliminary sketches should be made and, when satisfactory, followed by working drawings before cardboard model is made.

If the teacher has come to be in sympathy with his work, its culminating value can be reached by having it illustrate other school work. Models of public or historic buildings can be made and there may be constructed representations of the Pyramids, Washington Monument, vehicles, railway cars, various styles of dwellings, etc., indefinitely.

All through the course, simple lettering should be taught in connection with the names of models and pupils. Begin with capitals of uniform height established by light guide lines. Have the letters of the simplest form, the attention being devoted to good proportioning and spacing. Later the distinction between upper and lower case (capital and small) letters may be taught and the latter introduced into the work.

The children should know the name of each model before beginning work on it and should review its shape and characteristics before passing to the next.

There is a difference between the line of thought used in working up a development or a working drawing and that used in making an object from such development or working drawing. This should be understood by the instructor and might be brought to the attention of advanced pupils. In the one case, the work is all from detailed surfaces which, properly joined together, form the finished pattern or drawing. In the other case, one starts with the limiting rectangle or other figure and subdivides it as the drawing indicates.

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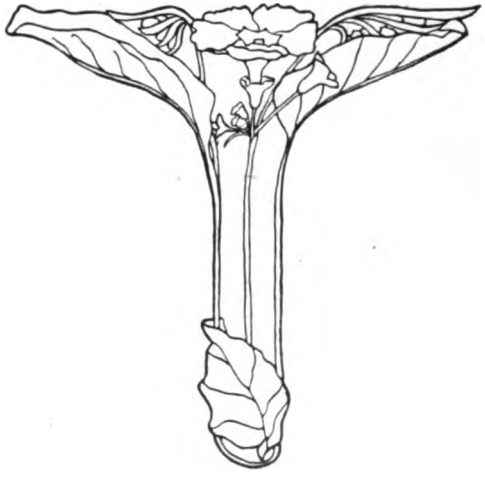
This distinction is easily appreciated in the respective operations of planning and building a house. The architect is first concerned with size and arrangement of rooms, halls, closets, etc., finally ascertaining the size of the house itself. The builder first lays out the frame and outer walls of the house and then runs up the partitions to form the rooms, halls and closets.

While not of itself a sufficient reason for the introduction of cardboard construction, it is well to note that the work outlined is a fine preparation for the woodwork so generally carried on in the upper grades. It gives acquaintance with the rule, with the sketch and working drawing and starts the pupil out with a better standard of accuracy. All this will enable the woodworking teacher to omit such preliminary work and to introduce, much earlier, the more advanced and more interesting projects.

I hope that I have indicated above that here is a form of elementary manual training for those schools which have felt that the choice was between an expensive form of work and none, that it gives a good training to the hand and eye, calls for original, constructive thought, gives an acquaintance with industrial ideas and, in short, vindicates its claim to recogntion as a worthy form of elementary manual training.



DRAWN BY C. HEROKNER

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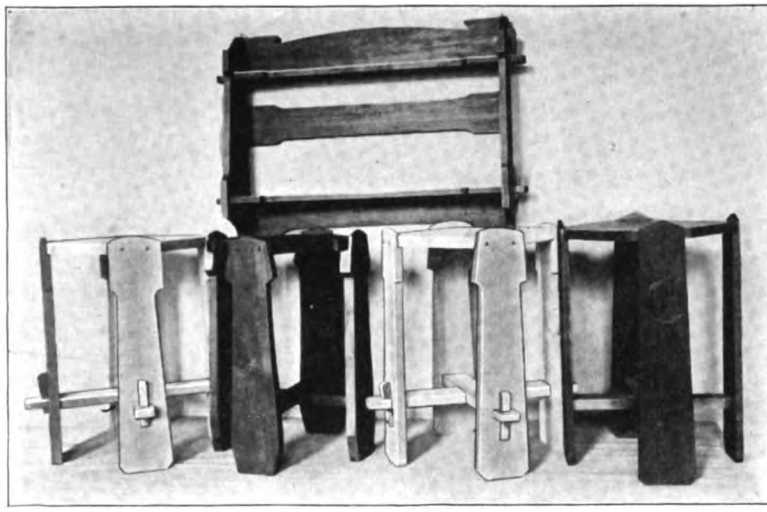

INTEREST AIDS IN GRADE JOINERY.

LOUIS C. BUTLER.

UPON first thought an article dealing with the problem of promoting interest in manual work seems unnecessary and useless. We are accustomed to the assertion that "all boys love their manual training so," that it is the one common meeting place in the system where boys good and bad shine with equal lustre, and that here reigns a happiness limited only by the duration of the lesson period. It is perfectly true, I feel, that every normal boy has a tendency towards an enjoyment of some form of manual expression and, as a private pupil, could readily be interested deeply in, and be led to work steadily at this particular subject. But as soon as you take this work into the common schools you are forced to confront the difficulty of a more or less rigid course of work on the one hand, and a large class on the other. This class, based, selectively, upon scholastic, not manual, attainments may vary in age several years, may include several who have failed at school and so are repeating, and may be added to or subtracted from during the term, as circumstances at the parent school may render necessary.

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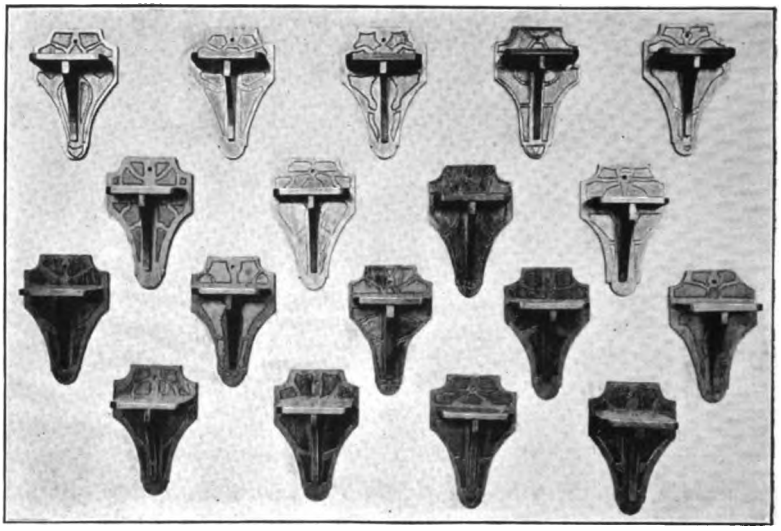
I have, in the beginning grade from one school, two brothers almost three years apart in age, several sadly undersized and physically undeveloped boys who have almost literally to be carried through their work, a large group of active, sturdy, healthy chaps full of life and willingness to express it, and a small number who, last term, most successfully completed all of my work of the grade and quarter, but failed



in their studies. Yet this mixture of ages, sizes, activity, and ability is a class, must be handled in demonstration and practice as a class, and have its work laid out according to grade, quarter and class.

Under these conditions we must admit the necessity of individual means and devices if we are to present our subject in its best, brightest, and most fruitful form to the children under our care. Too much indifferent manual training rests upon the evident fact that boys like the noise, relaxation and freedom from the quiescence of the schoolroom, and so produce models with little friction or objection; and too little intelligent teaching is based upon the somewhat less evident fact that by judicious interest aids and individual attention the real and lasting value of our work may be greatly enhanced in many and most interesting ways. With special and experimental schools and their small classes and large opportunities I have nothing to do, but speak

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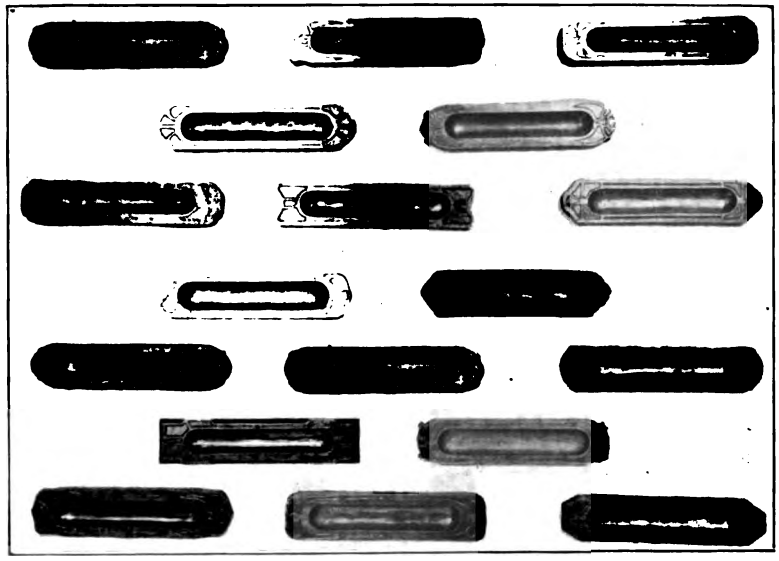
for those who, like myself, have large and varied classes and a course of study definite in detail, rotation of models and scope of effort.

Among the interesting devices I have found of value in my experience are careful grading of all models, after-school work for the laggards in a class, close personal relation between boy and teacher, interest in Christmas or other special work on the boy's part, having finished



work around the shop for observation, giving models out as soon as practicable after completion, and my specific topic here, individuality in outline and ornament as applied to the models outlined in our course. There is nothing startlingly new in all this, to be sure, but it is none the less true for all that, and it is even worth a second thought by the routine-driven grade joinery teacher.

Applied design is so facinating a subject that the ever-present danger in our shops is the tendency to follow the form and neglect the substance and end by constructing for design—a thoroughly false procedure. The instant you allow two standards in the shop, constructional accuracy and decorated beauty, you have really no standard at all and the bars are down for that type of careless, attractive work that our friends of the old school so rightly decry. To meet this

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objection, and others, and show what can be done, I shall give in brief detail the outline of my treatment of a very familiar model, the pen tray, with some illustrations of successes and failures.

Starting the pen tray, we work out the stock, ¾" x 2¾" x 12", gouge out the central depression, and finish everything clean; all must be done as demonstrated and in strict accord with our blue prints. This completes the "work" of the model and it is approved by me. Next various end outlines are discussed in class and patterns are made by tracing the square-end outline from the stock, folding lengthwise on center and cutting to shape. This is more graphic than any drawing for by unfolding the paper the boys see the actual outline, not a picture of it. Some cut several and, by holding against the light to get pure outline, select the one they desire. Then both ends of the model are worked out to this pattern and it comes again for approval before decoration is attempted.

Now, using this pattern, the boys attempt some applied design. The crude decoration of youth is wonderful and often runs to crossed flags, stars, hearts, shields, indefinite botanical specimens or else flourishes and scrolls without end. Then, too, the representative ability of the boys is so limited as to lead to results that are often wierd, as was shown by a boy of mine who produced a design consisting of two highly irregular loops of small sausage—his genuine attempt to represent a holly leaf design. In presenting the design problem, first have the whole class see samples of work completed in good, simple, space breaking; then let the boys have a try at it; and finally, suggest, curtail, revamp and redraw entirely as seems necessary. The good results may be yours, and the poorest, the most genuine boy production, but *each boy has had a try*, and the next time he will do much better. Keep the used patterns and form a design library as an inspiration to the following classes.

The design is worked out with a small—about $\frac{3}{16}$ is small enough—gouge, painted in with soft wood tints of brown, red or green, and the whole is stained or oiled and shellaced as the different woods require. Base your grading upon the joinery of the model and make the boys see that the decoration is their individual gain through their satisfaction in a product artistic as well as accurate.

By this method of handling the work, the weak lad may pluck up courage over his design, the "repeat" improve on his former effort, the strong worker attempt an ambitious outline and ornament, and the most rapid make two widely differing pieces—all working on the

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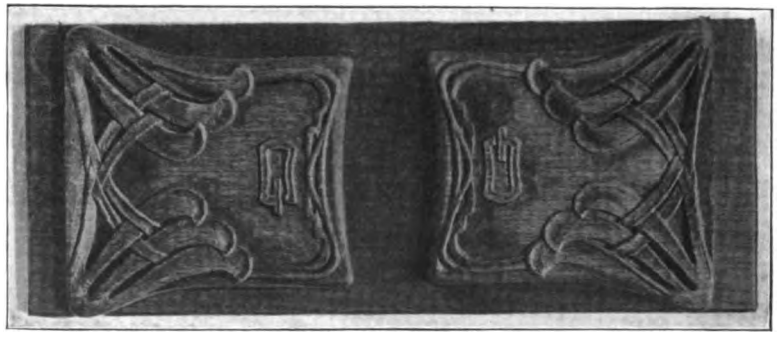
same model. Class technique, self-expression and genuine interest—here is the basis of all educational manual training.

I have selected the pen tray as a typical problem but similar freedom can well be employed in such models as the blotter pad, bracket-shelf, picture frame, book-rack, taboret, and others, in every case keeping stock strictly to uniform sizes and allowing directed freedom only—not unwise license. To illustrate, I show plates made from models I have at present on hand, being fully aware that some of the design work is sadly deficient. They are all, however, genuine grade work and serve to indicate possibilities that doubtless others will more fully develop, as indeed I hope to myself.

In conclusion I repeat my assertion that under present public school conditions our grade joinery, in order to be fully effective, must base itself through class work upon individual interest and one of the richest, most valuable and practicable interest producing methods is that of variation of the fixed model through individual modification in outline or decoration or both.



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ROOMS AND EQUIPMENTS FOR MANUAL TRAINING HIGH SCHOOL BUILDINGS.

FRED D. CRAWSHAW.

IN PLANNING the arrangement of rooms and departments for a high school one must consider the character of the courses of study. The high school in which manual training has a prominent place is the one with which this article deals; hence I shall consider only such courses of study as the so-called manual training high school provides for its pupils.

Herewith are shown floor plan views of three manual training high schools, each representing a particular type according to the method of caring for the work of the manual training department. The Los Angeles school is arranged to accommodate pupils of all grades in any particular department of work in one group of rooms. These rooms are easily accessible one from another and located on one floor. The Brooklyn Manual Training High School, on the other hand, has its rooms arranged to provide for all the work of a particular school grade on one floor. In this room arrangement very little attention is paid to the grouping of rooms in which the work of a particular department is done. Emphasis is laid upon the work of a particular year rather than the work of a department. The plans for the Manual Training and Commercial High School now being built in Peoria, Ill., were made to accommodate pupils of a particular school year with as little passing as possible from one floor to another, and, at the same time, the grouping of rooms for science, manual arts, commercial work, etc., was carefully considered. Thus, it is hoped that in this school a compromise has been made between the plans of the Los Angeles, and Brooklyn schools named which retains the best qualities of both.

This article aims to point out what seem to be some particularly good and equally bad features in the plans of these three schools, but before this is done let us form a mental picture of a building which will serve as an ideal, that we may be able to criticize the plans shown, and make comparisons.

Our ideal school should, in its construction and arrangement fulfill the following conditions:

First. It must be compact. The affiliated departments should be so arranged that material, apparatus and students may be handled with the greatest possible economy of time and labor.

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Second. It must be well lighted. This practically means that it must be built on the wing or central open court plan unless it is spread out over considerable ground, in which case the cost of ground and construction is large.

Third. It must be large enough to accommodate the specified maximum number of pupils and provide for all branches taught in schools of its grade. By this I mean that all departments should be provided for, in order that no one may be forced to modify his course of study simply to meet the conditions of the school.

That we may have a definite idea of the breadth of work which may be done in our ideal school, I suggest the following rooms and departments:

1. A power plant equipped with machines and apparatus for steam, electricity, water and compressed air, arranged with a view to student work in applied science and practical engineering.

2. A manual arts department including shops for wood and metal, viz.: An elementary woodworking shop; an elementary metalworking shop; a carpenter shop; a pattern and furniture-making shop; a machine shop; a foundry; a forge shop; and possibly a shop equipped for plumbing, steam fitting and repairing.

3. A science department planned for courses in physiology, botany and biology, physics and chemistry.

4. A domestic science department equipped for work in cooking, serving, sanitation, sewing, fitting and textiles.

5. A commercial department in which all the necessary work pertaining to modern business may be done.

6. A department of drawinig where elementary and advanced work in freehand and art drawing, as well as work in mechanical and architectural drawing will be provided for.

7. A sufficient number of classrooms for history, mathematics and the languages.

8. A large and commodious assembly hall for school and public gatherings which may be used as a study hall unless separate study halls are provided.

9. A good gymnasium.

10. Coat rooms and closets for both sexes on each floor.

In each of the departments there should be lecture and recitation rooms so that each department may be directed by one individiual as the head of the department, thus making of our school building a place where several schools are individually managed, but affiliated for the

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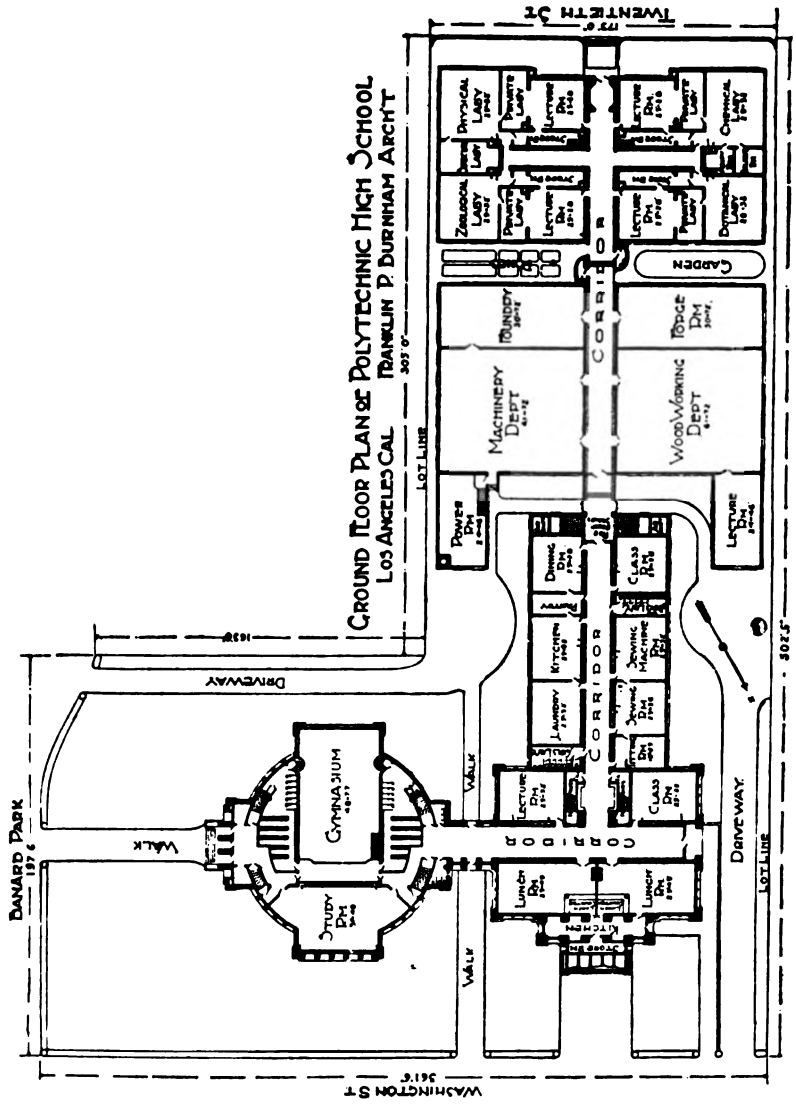

FIG. 1.—LOS ANGELES POLYTECHNIC HIGH SCHOOL—GROUND FLOOR.

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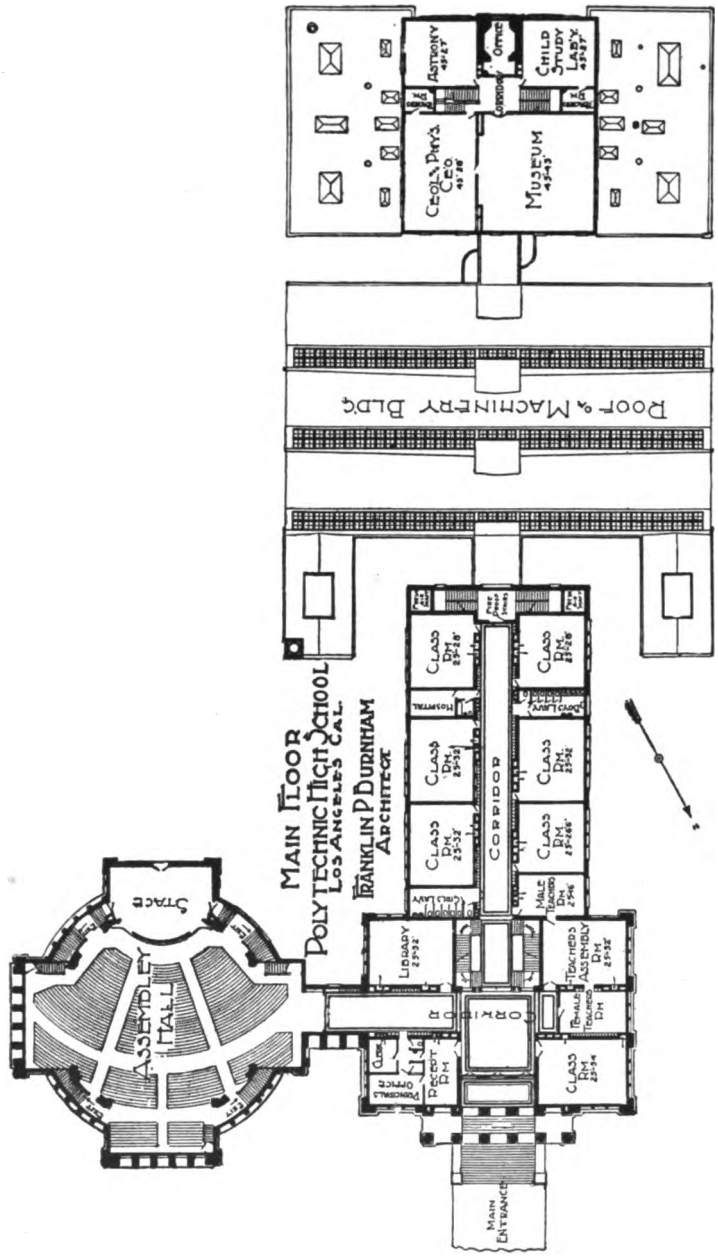

FIG. 2.—LOS ANGELES POLYTECHNIC HIGH SCHOOL—MAIN FLOOR.

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common good of all students through the management of a superintendent, director or principal.

This idea of having the rooms of a department arranged as a unit, and under the supervision of one individual, is economy from the standpoint of school management, and, I should say, the best plan for departmental work. However, in large schools, accommodating 3,000 or

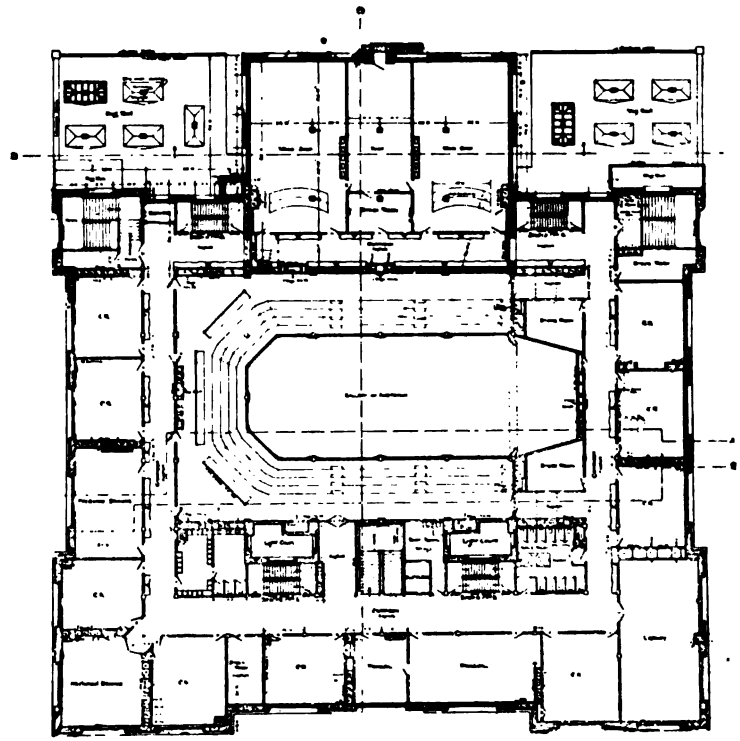

FIG. 3.—BROOKLYN MANUAL TRAINING HIGH SCHOOL—FIRST FLOOR.

4,000 pupils, where the passing of classes makes discipline an important factor in the school government, the plan of having all the subjects taught to a particular grade of pupils on one floor is possibly desirable. In this case shops and laboratories, in which the work of the several school years is done, must be located on different floors—all first year work on one floor, second year work on another floor, and so on.

In the first part of this article general reference was made to the accompanying illustrations. A short detail study of them will further

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emphasize the ideas expressed in the foregoing paragraphs. Fig. 1 and Fig. 2, first and second floor-plan views of the Los Angeles Polytechnic High School, furnish excellent illustrations of the departmental grouping of rooms. In Fig. 1 is shown a symmetrical arrangement of three groups of rooms; one for all work classed as domestic science, one for all mechanical work and a third for all of the pure science studies. For the mechanical and pure science departments the problem of light is

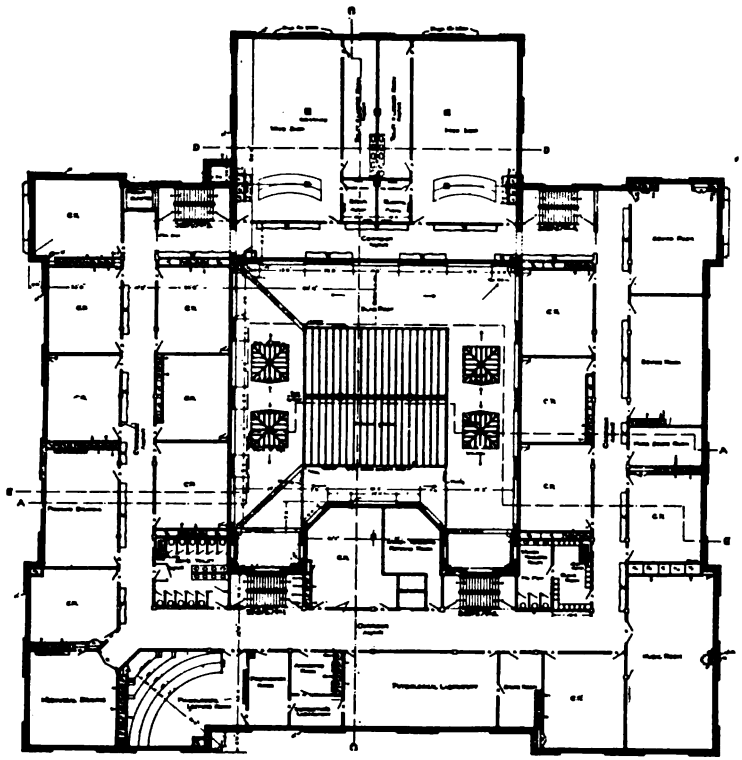

FIG. 4.—BROOKLYN MANUAL TRAINING HIGH SCHOOL—SECOND FLOOR.

solved by having the building occupied by these departments one story high, except the central part of the rear wing which is covered by a second floor as shown in Fig. 2. A part of this central portion is also covered by a third floor for an observatory. The rooms for the domestic science department, too, are well lighted since there is but one series of rooms between the corridor and the outer walls of the building.

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Fig. 2 shows an equally well unified arrangement of rooms for the work of the school not requiring special laboratories or shops. The front part of the building (not including the wing used for an assembly hall and gymnasium) is three stories high; the third story is used exclusively for a commercial department.

As the plans show, the building really consists of four separate

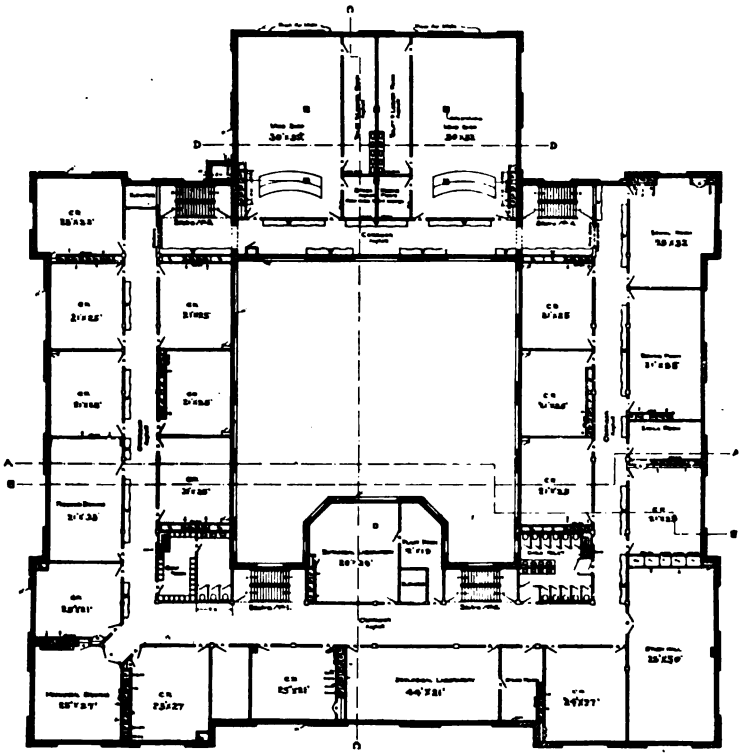

FIG. 5.—BROOKLYN MANUAL TRAINING HIGH SCHOOL—THIRD FLOOR.

buildings joined on separate floors by passage ways; and in the four buildings, according to room arrangement, are several individual departmental schools. From the standpoint of the departmental work this school seems ideal, but from the standpoint of building economy and general school government some will argue that a more compact construction is desirable.

In Fig. 3, Fig. 4 and Fig. 5 are shown the first, second and third floor plans of the Brooklyn Manual Training High School. It will be

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noticed at a glance that practically all the work of a particular school year may be done on any one floor. For example, on the first floor provision is made for the particular freehand and mechanical drawing, science and shopwork, as well as regular classroom work, for first year pupils. Fig. 3 and Fig. 4 similarly show how second and third year pupils respectively are likewise cared for on one floor. Mechanical

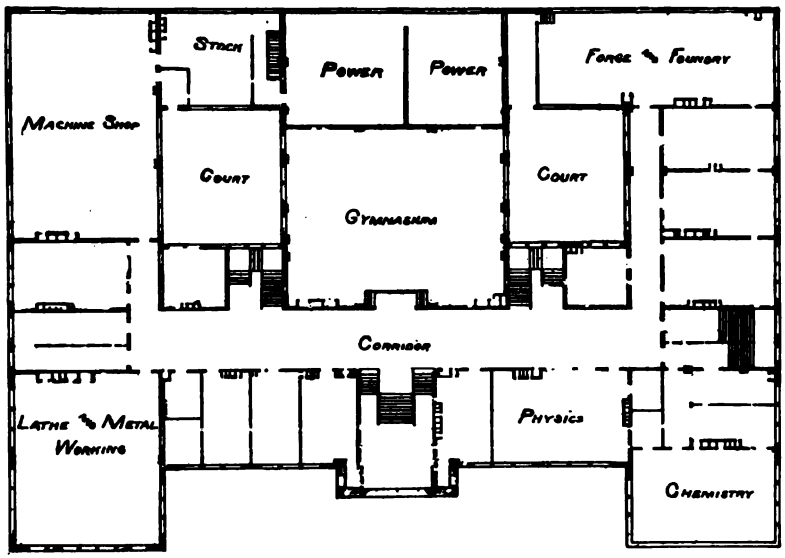

FIG. 6.—PEORIA MANUAL TRAINING AND COMMERCIAL HIGH SCHOOL—BASEMENT.

drawing is done in the same corner of the building on each floor. The shops, sewing rooms and science laboratories, also, occupy similar positions on the different floors. On each floor, too, are a sufficient number of classrooms for the pupils of a particular school grade. Here, then, is a building which evidently houses an entire school on each floor, there being as many schools as there are floors. The building is compact, well lighted and economical from the standpoint of construction. But from the standpoint of economy in departmental work and general school management we could hardly recommend such an arrangement except where the conditions of a dense population and high-priced land demand it.

Now in Fig. 6, Fig. 7 and Fig. 8, showing three floor plan views of the Manual Training and Commerciail High School being built in Peoria, we find an arrangement of rooms differing from the arrange-

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ment in either of the other schools illustrated. Here the rooms of a department are in close proximity as a rule, but not all on one floor, necessarily. The idea of all the school work of a particular school year being done on one floor is not apparent in the plans, nor will it be possible for this to be done, although a careful study of the plans will show that classrooms and demonstration rooms have been liberally provided

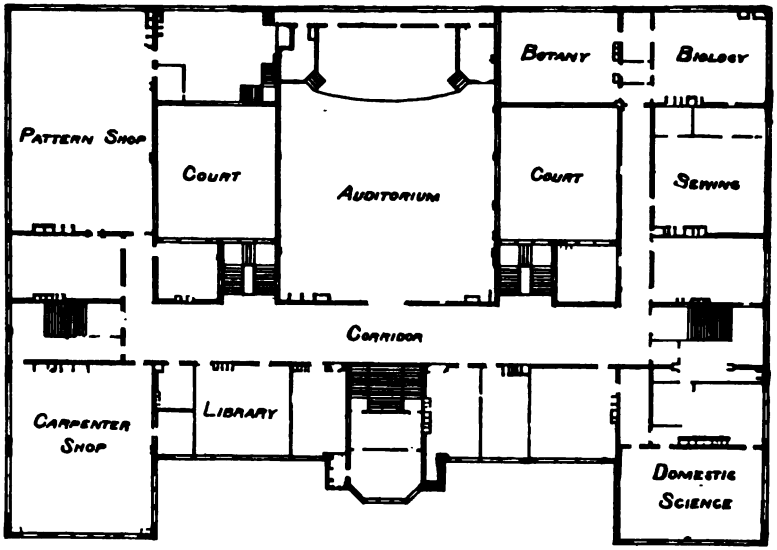

FIG. 7.—PEORIA MANUAL TRAINING AND COMMERCIAL HIGH SCHOOL—FIRST FLOOR.

to make this plan possible in a large measure. The designers of this building have tried to gain the advantage of the departmental plan of arrangement by the grouping of rooms so that one person may supervise the entire work of the shops, science laboratories or commercial department. They avoid duplicate rooms as in the Brooklyn school because the number of pupils the building will accommodate will not demand such a multiplication. They have endeavored to make the building as economical as possible from the construction side consistent with departmental and school management. In the opinion of the writer they have gone too far in this direction in two particulars. First: If the front central portion of the building had been made four stories high it would have added a central tower to the present plans which would have helped in architectural design and further made room for a light, airy group of rooms for all drawing work. Second: If a small two story

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power building had been placed at the rear of the present building all of the dirt and noise of this department could be kept away from the main building, besides providing room for the foundry—now in the corner of the basement—forge room and dry rooms.

In contrast with these possible weak points in the design of this building we may mention the following strong points:

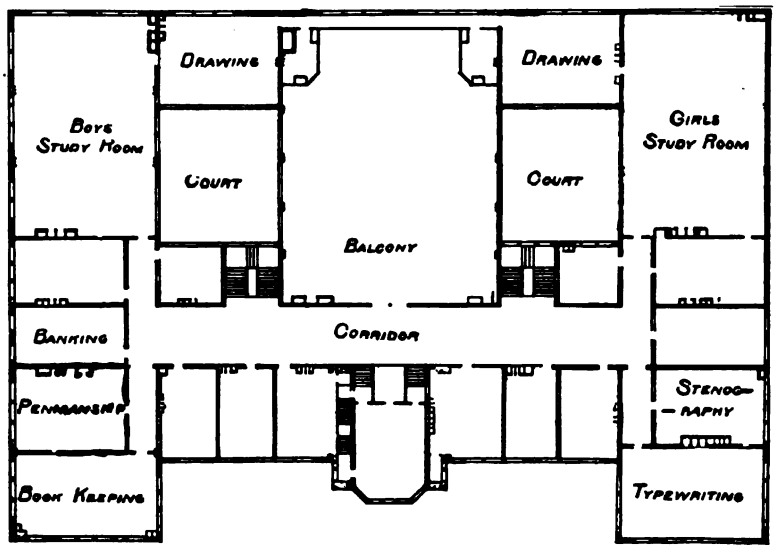

FIG. 8.—PEORIA MANUAL TRAINING AND COMMERCIAL HIGH SCHOOL—SECOND FLOOR.

1. A compact construction allowing good light for all rooms.
2. A practical grouping of rooms for departmental work.
3. A plan by which much of the work of a particular grade may be done with comparatively little passing from one floor to another.
4. An adequate number of demonstration and recitation rooms within or immediately adjoining a departmental group of rooms.
5. Closet and coat rooms on every floor.
6. Stock and cutting rooms adjoining the machine and pattern shops.

EQUIPMENT AND SPACE FOR IT.

The planning of a manual training school building should be done by at least two men, viz.; an architect and a teacher familiar with the conditions under which the school will be managed. Too often the teacher is not consulted until the time for equipment to be purchased

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and then it is found that the arrangement of rooms is poor and, what is even more deplorable, the rooms are inadequate in shape or size for the work to be done in them. In order to determine facts about the size and shape two things must be known while the building is being planned;

1. The class unit or number of pupils per class and,
2. The equipment for each room.

I shall attempt here only to estimate the amount of floor space necessary for rooms in the manual arts department. A study of the plans of manual training shops will reveal the fact that the average shop or laboratory room is about one and one-half to two times as long as it is wide. Where the demonstration seats are placed in and at the end of the shop room the length is approximately twice the width. The shops of the McKinley High School in St. Louis are good examples of this type of room. These shops are forty feet wide and eighty feet long. The proposed Peoria high school is planned to have all class demonstration and recitation work done in a room adjoining and between two shops. The length of these shops vary from one and one-fifth to one and one-half their width. As in the McKinley school the widths are forty feet; the lengths are forty-seven and sixty-one feet. It is believed the width of most shop rooms should not be considerably less than thirty-five or forty feet.

The class unit in the opinion of the manual training teachers should not exceed twenty-four. Many of us feel that the maximum number of pupils in a shop class should not be more than twenty.

In such work as foundry practice and forging a class even smaller than this is desirable. The crowded condition of the average public school shop, however, demands a class unit as large as possible; for this reason, and for convenience in computation, the following shop sizes are given for classes of twenty-four pupils managed by one instructor.

First Year Woodworking and First Year Metal Working Rooms. —Twenty-four individual benches and twenty-four individual lathes— 2,250 square feet of floor space. This allows forty square feet of floor space per pupil for bench or lathe and 330 square feet of general floor space for cases, etc. In making this estimate three feet are allowed for aisles between the ends of four foot lathes and benches and the space allowed for aisles running the long way of the benches approximately three and one-half feet. It is probably true that some will criticise this estimate for individual floor space as too large. In no case should I think it could well be less than thirty-five square feet per individual.

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Where double benches are used in which locker space is provided, both the individual and general floor space may be reduced slightly. The individual space, however, would remain nearly constant because the aisle space must be greater as the bench space decreases to allow two pupils to work in each aisle instead of one.

Carpenter or Pattern Shop.—Twenty large individual benches, three feet by seven feet, placed around the room. Twelve speed lathes and six floor machines—2,500 or 2,600 square feet of floor space. This allows 1,000 square feet for benches with a three-foot working space in front of benches, 1,500 or 1,600 square feet for machines and for general floor work. The plan of having a machine room adjoining the general student shop is a good one for many reasons. Where this arrangement is adopted the general floor space may be reduced one-half.

The arrangement of the machine shop in general will be similar to that of the pattern shop—benches around the wall and machines in the center. For the same class unit the floor space in a machine shop should exceed that of the pattern shop, unless the character of class work is such that considerable individual instruction is given. In this case benches and machines may be used by different members of a class during a particular shop period.

The forge shop and foundry rooms should approximate in size the pattern and machine shops although the total amount of floor space may be a little less than that given above.

The mechanical drawing and freehand drawing rooms should be about one-half the size of the first-year shops. This estimate is made on the basis of forty square feet of floor space per individual.

All of this data on shop sizes may be summarized and put into the convenient form of formulae for architects or those designing manual training buildings. Using forty square feet of floor space for each individual equipment in shops equipped with manual training benches and speed lathes, and one sixth of the actual floor space used by benches, lathes and aisles for a general floor space (not including demonstration seats), the formulae is as follows:

$$40n+\frac{40n}{6}=\text{total room area in sq. ft.}$$

This reduces to practically 47n=area in sq. ft., where n is the number of individual equipments.

Using forty-two square feet of floor space for benches and working space in front of the large benches placed about the room, and one and

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one-half times this amount for general floor space our formula for such shops as pattern, machine, forge and foundry is:

$$40n+\frac{3}{2}\text{of } 40n, \text{ or } 40n+60n. \text{ which equals } 100n.$$

This is the total floor space or room area in square feet.

In this paper two things have been attempted. (1) To present the ideas of some of our leading manual training teachers, and architects of manual training buildings, on curriculum, departments and equipment. (2) To arrive at some conclusions which may influence the design of new buildings.

MADE BY PUPILS OF THE EIGHTH GRADE, ADRIAN, MICH.

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EDITORIAL

As Others See Us.

Unqualified praise of one's work is usually of little value to the worker, but discriminating, sympathetic, constructive criticism is invaluable. Perhaps this statement was never truer than when applied to the manual training work of our American public schools today. We do not need the effervescent praise of our too zealous friends, nor any more of such sarcastic and misleading criticism as we received two years ago at the hands of the Massachusetts Commission on Industrial Education. What we need is to be told how we may do better, and we like to be told by someone who really understands and appreciates what we are doing. Such a helpful criticism of manual training in American schools may be found in an article by Charles L. Binns in the March Number of the *Manual Training Teacher*. The article is a report on visits to American schools, and in an unusual degree reveals a sympathetic appreciation of our problems and our methods, while at the same time pointing to some of the chief defects in our work. Especially at the present time, when we are discussing "industrial education" and "industrial efficiency" do Mr. Binns' criticisms seem to be suggestive. After commending much of the handwork done in our primary and lower grammar grades he says:

> So far as actual benchwork results go, it may be safely said that our [English] manual training work is quite up to the best work in the American schools. From the point of view of accuracy it is much superior. The lack of exactness is the main defect of American manual training. But there are many compensations to be balanced against this, and these arise chiefly, in my opinion, from the fact that the teacher is allowed more liberty to follow his own judgment in teaching the subject than is the case here. He has more scope for exercising his initiative, with the result that he retains the freshness of interest and enthusiasm for his work that our own stereotyped and restricted schemes do much to quell. There is a fine spirit of free activity, eager interest, and industry permeating most of the manual classrooms. Even the inferior work is done with a happy glow of achievement that half excuses it. We English are so afraid of being thought frivolous that we often forget to be buoyant. * * *
>
> To emphasize unduly the aim of rigid mechanical accuracy generally means a sacrifice of the thought side of the work. Those qualities which lead eventually to the realization of the pupils' highest powers—such qualities as intelligent self-direction; an alert resourceful attitude of mind; and power to plan

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means to an end—are too valuable to lose for such an aim. Accuracy comes naturally and as a matter of course when the boy begins to "find himself," if the instruction be of the right kind.

At the same time a system of handwork that ignores a reasonable standard of accuracy does not count for much. In the course of my visits I found more than once not only an almost entire disregard for exactness in the work of the boys, but also an almost entire neglect on the teacher's part to strive for it. Something may be said for a method which grants the pupils liberty to express themselves freely in their work, if the results are critically examined and errors pointed out, but to accept and pass complacently work manifestly inferior is quite inexcusable. There is an element of haste about some of the work which may partly account for this. The desire to get through with things, whether it be work or meals, is characteristic. And while quick work may be less harmful in its effects than quick lunches, to make haste slowly would be clear gain.

Surely this is sympathetic criticism and we ought to profit by it. Concerning the shopwork in our manual training high schools Mr. Binns says:

I found the work invariably good, and, in most cases, marked with a thoroughness and high standard of excellence that reflect great credit on the teachers. —B.

National Education Association Meeting

The Manual Training Department of the National Education Association has had a significant development. The early meetings, following its organization, were small and comparatively unimportant, but with the increase of interest in the manual arts as a factor in education they have come to be considered as among the most important and best attended meetings of the Association.

The Cleveland meeting of this department will be particularly significant because of the unusual interest at the present time in the problem of industrial education. It will be in a sense a culmination of two great meetings held within this year: The meeting of the National Society for the Promotion of Industrial Education in Chicago and the meeting of the Department of Superintendence in Washington at which an entire session was devoted to industrial education.

The program is devoted entirely to this problem under the general topic, "The Place of Industries in Education." There will be three sessions of the department, one a joint session with the department of Women's Organizations, at which the general topic will be presented under sub-topics—"Democracy in Education," "The Industries as a Factor in Education," and "A Program of Industrial Education." Every phase of the subject is treated in the seven formal addresses which

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make up the program and in the formal discussions. In its completeness and unity the program is exceptional. Much credit is due Dr. J. D. Burks, president of the department, for his thoughtful analysis of the industrial problem in education. The speakers are well-known educators, distinguished in their respective departments. —R.

The Summer School

The value of the summer school to the manual training teacher is evidenced by the rapidly increasing number and importance of courses offered to teachers of this department of educational work. The constantly changing aims and methods in manual training and the consequent inadequacy of its literature make it the most practical and efficient means of keeping in touch with the work. It is a vital means of growth to the teacher whose experience carries him back to the days when careful preparation and training were not demanded. But the value of the summer school is not alone in the courses of study which it offers. Widely divergent methods and problems make the association with teachers from all parts of the country of inestimable value, and it is the only way that the worker in the field has of coming under the direct influence of the specialist.

A part of a vacation spent in the pursuit of a congenial course is not necessarily arduous. As a matter of experience, it is oftener recreative and there is always the after-feeling of satisfaction of something accomplished. Moreover, simply as a commercial enterprise the summer school is a safe investment of time and money with practically sure returns, in proportion to the interest and effort of the student. It is from the ranks of earnest workers who are abreast of the times, and constantly seeking the aids to professional attainment that vacancies are filled and promotions are made. —R.

MADE BY STUDENT AT PRATT INSTITUTE.

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ASSOCIATIONS

WILLIAM T. BAWDEN, Editor.

THE NATIONAL EDUCATION ASSOCIATION.

The Department of Superintendence held its annual meeting at Washington, D. C., February 25-27, 1908. It was the largest and most successful meeting the department has ever held.

The problem of Industrial Education seemed to be the pressing one and there were few speakers in any of the meetings that did not refer to it in some of its phases.

The Tuesday morning session was opened with an address of welcome by the Honorable Joseph Cannon, Speaker of the House of Representatives. He was followed by Willett M. Hayes, Assistant Secretary of Agriculture, who spoke on the close relation of the department of agriculture to our educational institutions, and the increasing importance of the study of agriculture in our public schools.

The next speaker was United States Commissioner of Education, Elmer E. Brown, who said:

"The questions we are to discuss here, and the things we are to do in our several fields when this meeting is over are all matters of national concern. There are two great ends in particular which we hope will be furthered by our meeting of the year 1908, in the city of Washington. In the first place, it may bring about a more perfect union between the forces that make for culture and the forces that make for industrial training. In the second place, it may strengthen the bonds which make of our many State systems of education one national system of education."

Supt. S. L. Heeter of St. Paul, Minn., speaking on "The Saving of Time and Energy in Public School Work," said, in substance: "We must simplify the academic subject matter of the first six grades of the elementary schools; introduce into the first six grades a comprehensive system of primary industrial training; socialize and industrialize our so-called grammar schools; rearrange school hours for those forced by circumstances to go early to work, and establish a closely articulated elementary system of apprenticeship between the grammar schools and leading industrial enterprises. In addition to this we should have night schools and half-day continuation schools; the abolition of the old-time classical high school, as such, and the introduction of general manual training and commercial courses in all high schools, with the establishment of at least one secondary industrial school in every city.

The afternoon session was devoted to a symposium on "The Place of Industries in Public Education," which was arranged by Dr. Jesse D. Burks, of Albany.

Dean Russell of Teachers College, Columbia University, led the discussion with a plea for a system of schools that will give the laboring man as

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good an opportunity to learn his business as we give the professional man, in the professional schools, to learn his business. He insisted that what we do in this way must be as a supplement to what we have and not a substitute for it.

Professor Elliott of the University of Wisconsin spoke of the necessity of careful investigations of conditions and requirements in order that we may proceed wisely in organizing the work. In the discussion which followed Mr. Brundage of the Stout Training School, Menomonie, Wis., said:

"I claim that the pupil in the industrial school must be an intelligent and real worker who produces the goods. He must be a vital factor in the work, a transformer, a positive not a negative force, and have an active, not passive, interest in his surroundings, where he is being prepared for life's work. The time has come in the life of this nation when immediate steps must be taken by its body of educators to meet the urgent demands of its citizens in making adequate provision for this great social and industrial need."

This was followed by a paper by James F. McElroy, president of the Consolidated Car Heating Co. This paper is of special interest because it presented the subject to the convention from the point of view of the manufacturers. His theme was, "The most urgent need of our educational system is an adequate provision for the vocational needs of children destined for industrial and domestic pursuits."

He showed that in the city of Albany, N. Y., there was a falling off in the attendance from 1,551 the first year to 551 in the eighth year. He claimed that this falling off was due mainly to the fact that a large proportion of the children in the schools are either forced by circumstances to leave school before they have graduated from the grammar grades, or they leave through want of interest. A close investigation of the manufacturing industries of Albany, the speaker said, developed two facts: That out of all the men employed in the mechanical departments less than 1 per cent ever attended a high school, and only about 7 per cent had completed courses in the grammar schools.

"The ordinary mechanic in our manufacturing institutions is indebted to our school system for teaching him how to read and write and for some instruction in mathematics, but outside of these elements of education, the schools furnish him practically nothing that is of value or helpful in the struggle which he must maintain the rest of his life. The course of study in our schools is based upon the theory that the student will continue throughout the entire course and graduate from the high school, and this course is designed to prepare the student for admission to college. This course of study, it seems to me, is unjust, unfair and unreasonable, so far as it relates to over 65 per cent of the total school population.

"At the age of boys in the grammar schools, they are fascinated with the study of mechanics and all kinds of machines for generating and applying power. At this age a boy is much more impressed by doing things himself than by being told by other people how things are done.

"If our schools furnished him the opportunity that he longs for, there would be little tendency to shirk his duties, and the services of the truant officer would not be required. There would also be no temptation on the part of parents to take the boys out of schools in order that they might learn something practical elsewhere.

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"Young men destined for industrial pursuits, not only do not receive in the schools a proper education for their life work, but after leaving school, they find no place in which they can receive instruction in the trades which they may select. Our manufacturers can not afford to maintain industrial or trade schools, and it is not their business to do so, even if they could afford it. This is a work that properly belongs to the public schools."

The speaker insisted that this training should be done in the grammar schools rather than the high schools.

Miss Langley of Chicago University read a paper in which she emphasized the necessity of constructive handwork from the kindergarten through all the grades.

During the discussion Professor Hanus of Harvard said: "Manual training has become academized. There is no attempt to teach a trade. Business courses in our schools are inferior. The industrial courses in our schools are not fundamental, but incidental. The leading motive is culture, whereas in industrial education, it should be training for proficiency."

Wednesday morning the annual election of officers was held and resulted as follows: W. H. Elson of Cleveland, president; David B. Johnson of Rock Hill, S. C., first vice-president; Miss Ida Bender of Buffalo, N. Y., second vice-president; A. C. Nelson of Salt Lake City, Utah, secretary. Oklahoma City was chosen as the next meeting place.

The feature of the day was the reception at the White House by President Roosevelt. In the course of the President's address he said: "I trust that more and more our people will see to it that the schools train toward and not away from the farm and workshop. We have spoken a great deal about the dignity of labor in this country, but we have not acted up to our spoken words, for in our education we have tended to proceed upon the assumption that the educated man was to be educated away from and not toward labor.

"Teach the boy that he is to be expected to earn his own livelihood, that it is a shame and scandal for him not to be self-dependent, not to be able to hold his own in the rough work of actual life. Teach the girl that so far from its being her duty to try to avoid all labor, all effort, that it should be a matter of pride to her to be as good a housewife as her mother was before her."

Thursday morning was given over to conferences of the various departments of education represented. The afternoon discussion was on "The School as an Instrument of Character Building." In the evening the Board of Education of Washington, D. C., gave a reception at the Corcoran Art Gallery.

R. W. SELVIDGE, Teachers College, N. Y.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The fifteenth annual meeting of the Western Drawing and Manual Training Association was held at Shortridge High School, Indianapolis, Indiana, April 7 to 10, 1908. Visits to the Indianapolis schools and to the Winona Technical Institute were arranged for the early part of Tuesday and in the late afternoon there was held an informal reception by the Indianapolis art and manual training teachers. The reception was preceded by informal talks on the work in the manual arts in the Indianapolis schools by Miss Wilhelmina Seeg-

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miller, director of art, and Louis A. Bacon, director of manual training. These talks took the form of a practical exposition of the conditions under which the work is being done and were very suggestive. A brief summary of these conditions would include: a sympathetic and progressive superintendent; liberal appropriations; for example, for the first four grades, $3,000 per year for handwork and $1,500 for art work; frequent conferences of supervisors and teachers during regular school hours instead of after school or Saturdays; a systematic plan of preserving samples of pupils' work; above third grade all handwork in the hands of special teachers.

The formal program began at eight o'clock Tuesday evening in the Caleb Mills Hall, Shortridge High School. After music and the invocation addresses of welcome were delivered by Hon. Charles A. Bookwalter, Mayor of Indianapolis, Charles W. Moores, president of the Board of Education, Calvin N. Kendall, superintendent of public schools, and John A. Hollett, president of the Commercial Club.

The annual President's address was delivered by Charles A. Bennett, who took for his subject: "'A Cycle of Development." "During the past year as I have listened to urgent demands for industrial training in our public schools I have been reminded of similar demands made nearly forty years ago, and I have come to realize that the teaching of the manual arts has completed a cycle of development in our schools. The same arguments put forward today were used by the advocates of industrial drawing just preceding the passage of the act of 1870 in the State of Massachusetts, which provided for free instruction in drawing in cities of 10,000 or more inhabitants." The speaker reviewed the history of the development of drawing in our public schools and the introduction of manual training. The change of motive indicated by the use of the term "art education" and the contributions made by students of psychology and the rise of the Arts and Crafts movement were considered. In view of the stages of development through which we have passed, we should see the present demand from a viewpoint different from that of forty years ago. "Making a hasty inventory of our teaching inheritance, it might read as follows: 1. Drawing and manual training for the development of technic; 2. Analytical study of processes with reference to the elementary school; 3. A striving for the beautiful; 4. Drawing and construction as a means of expression in the primary grades; 5. The adequate representation of form and color in the upper grades and in the high school; 6. The marriage of art and craftsmanship and the new life that has come to design on account of it. With such an experience behind them the teachers of the manual arts may look forward with confidence."

Next came the address by President William L. Bryan, Indiana State University, on the subject: "Moral Education Through Art and Manual Training." "Art is not the only means for instruction in morals—perhaps not the chief means. * * * It has been recognized that the school exerts its greatest moral influence not through any specific instruction." If a child demands something which he does not deserve, as when he asks to be promoted when he has not made the necessary grades, or asks to be allowed to play on the team when he is not carrying the prescribed amount of work, "the school is confronted with the paramount question in moral education." "If, in such a case, the right and

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just thing is not done a deadly wound is inflicted which cannot be cured by a sermon or by a picture of the Sistine Madonna." Referring to the plan of art instruction outlined in the "Republic" of Plato, the speaker urged the importance of the task of selecting works of art to be placed at the disposition of the child. "Cast out the second rate and the commonplace; burn up all the pictures that are not eternally good. * * * The same thing holds true of all the arts. In singing, for example, when we sing second rate music we are filling our minds with something that takes the place of the best."

The Wednesday morning session opened with music by a chorus of children from School No. 27. The principal address of this session was made by Miss Mary S. Snow, Pratt Institute, Brooklyn, N. Y., on "Household Economics in the Course of Study." Miss Snow dwelt upon the insecurity of the place which this work has in the public schools as yet, and urged upon all interested the necessity of organizing and conducting the work so as to establish it upon a firmer basis in the curriculum. The opinion erroneously held by some that the domestic science work is largely empirical and of little disciplinary value was ably refuted.

Reports of progress in the work to date were presented by the chairmen of two committees: Miss E. E. Langley, School of Education, Chicago, for the committee on "Handicrafts in the Public Schools"; and John S. Ankeny, Jr., University of Missouri, for the committee on "Art Work in the Universities."

At the afternoon session Frederick L. Burnham, State Agent for the Promotion of the Manual Arts, Massachusetts, spoke on "The Need of the Power to Visualize in the Manual Arts," illustrating his remarks by blackboard sketches. "I believe that the majority of people can so clearly understand this subject of drawing that they will be able to do in a way work similar to that which they do along other lines. They are not all orators who learn to read. All people who can add and subtract are not wonderful mathematicians, but they can use this knowledge daily in their work."

Wednesday evening was very pleasantly spent at the John Herron Art Institute, where the members of the Association were received by the Art Institute and the Commercial Club. An exhibit of canvases by several prominent Indiana artists had been arranged for the occasion.

One especially enjoyable event that occurred on Wednesday was the dinner given to the officers of the Association and a few invited guests, twenty-four in all, by sixteen negro boys from the cooking classes of the McCoy School. The table was spread in one of the long corridors of the building, which was made quite attractive with rugs and decorative plants. The supper was planned and served by the boys under the direction of Miss Elizabeth Rinehart. During the serving of the supper the guests were entertained by a chorus of 7th and 8th grade pupils from the school, directed by Mrs. Lillian Brown, who gave a number of negro melodies and folk-songs. The officers of the Association were so much pleased with the singing that by special request the chorus appeared as an extra number on Thursday's program.

The Thursday morning session was devoted to a series of four round table discussions. The general topic of the first was: "The Relation of Art and Manual Training in the Elementary Schools." The leaders in the discussion were

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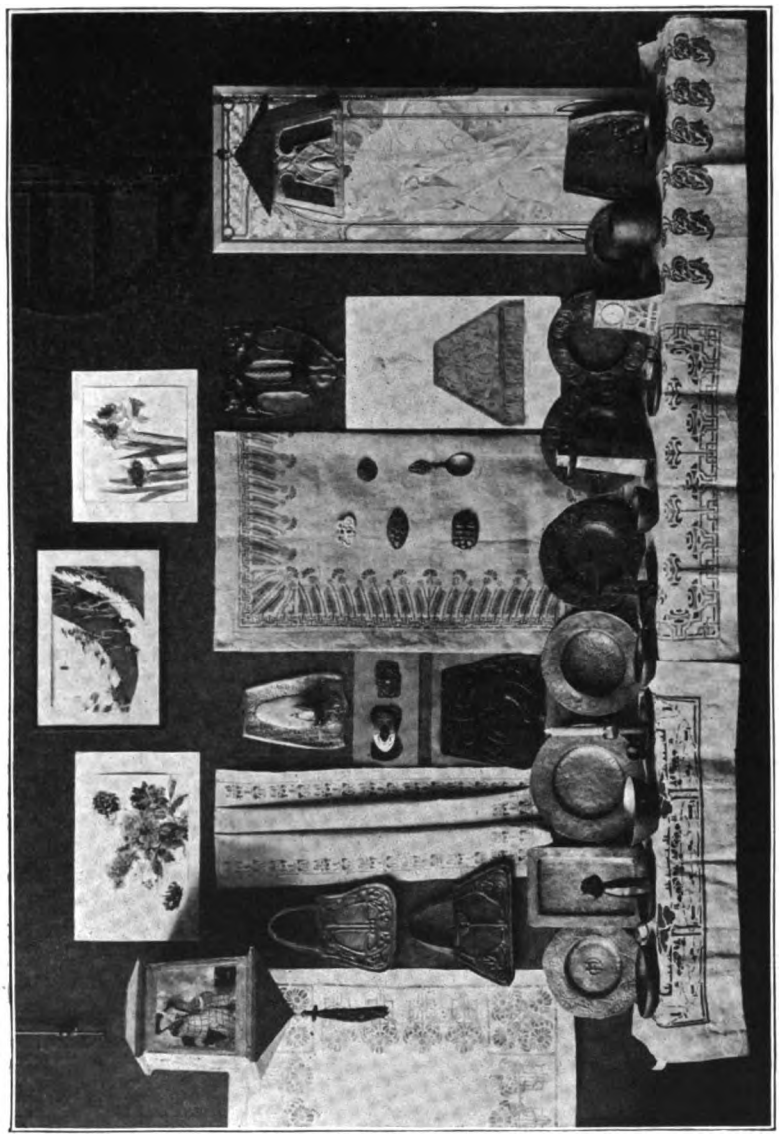

PART OF EXHIBIT OF SHORTRIDGE HIGH SCHOOL, INDIANAPOLIS.

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Fred C. Whitcomb, Miami University, Oxford, O.; George W. Eggers, Chicago Normal School; Mary Alice Wright, Bloomington, Ind.; and Milton J. Clauson, Denver, Colo. It seemed to be generally agreed that in the elementary school there should be one central line of work with an art side and a construction side, although there were those present who contended for two distinct subjects.

Another group discussed "The Course of Study in High School Art." The leaders were Edwin J. Lake, University of Illinois; William H. Varnum, James Millikin University, Decatur, Ill.; Antoinette P. Taylor, Yeatman High School, St. Louis. Attention was directed to ready-mixed colors and harmonies that can be used thoughtlessly, drawing slates, the working over of ready-made designs and other "royal roads that end in vanity." One speaker made a plea for the establishment of a show room where the work of advanced and capable students could be not only exhibited but offered for sale.

Probably the most enthusiastic group was the one that assembled to discuss "The Place of Domestic Economy in the Public Schools." The leaders in the discussion were Elizabeth Rinehart, Indianapolis, and Mary S. Snow, Pratt Institute, Brooklyn, N. Y. The far-reaching influence of domestic science work and the importance of conducting the work on a thoroughly practical and economic basis were among the points brought out.

The fourth group considered "Manual Training in the High Schools." The leaders in discussion were James F. Barker, Technical High School, Cleveland; E. G. Allen, M. T. H. S., Indianapolis; and E. P. Chapin, M. T. H. S., Louisville, Ky.

In the afternoon Walter S. Perry, Director of Fine Arts, Pratt Institute, spoke on "The Exhibits." He suggested the advantages of series of exhibits made up in such a way as to set forth the courses of work being taught. He expressed the belief that some schools were being carried away by fads and that many teachers were teaching things because they saw them in exhibitions or because others were teaching them or simply because they were the latest things. He was of the opinion that many teachers are trying to do too much, at the expense of accuracy and thoroughness. "Let us stick to the fundamentals and a few things and do those things well."

At the close of this address a schedule of arrangements was announced according to which exhibitors were present to explain their exhibits at certain times during the remainder of the afternoon. The exhibits were very conveniently arranged in the three buildings of the high school, practically all under one roof. In most cases each city or school system had its exhibit in a room by itself. Visitors were supplied with copies of a diagram showing the floor plans of the building with numbering of the rooms and a list of exhibitors.

An innovation that seemed to please all concerned was an arrangement worked out by the Exhibit Committee and the Editorial Board in co-operation providing convenient space for commercial exhibits.

Thursday evening an illustrated address was delivered by Arthur W. Dow, Teachers College, New York, on "The Teaching of Art to Children." With the aid of a number of slides he showed how art slowly but surely influences a people and how the artistic sense is developed. He took occasion to criticize the ten-

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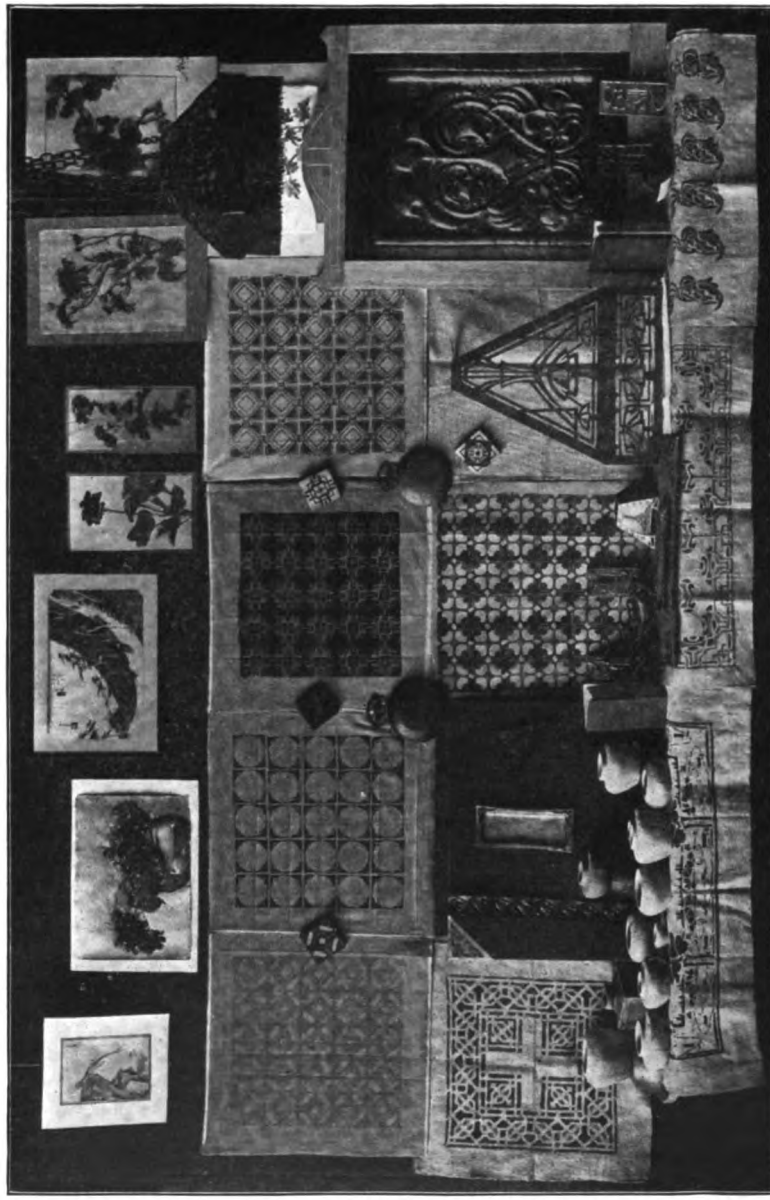

PART OF EXHIBIT OF SHORTRIDGE HIGH SCHOOL, INDIANAPOLIS.

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dency to accept art work because it is Japanese or German or French, and showed that there is much poor work among the examples we are asked to accept.

On Friday morning President William O. Thompson, Ohio State University, spoke on "The Place of Manual Arts in the School." The following extracts may give some idea of this address: "There is always danger that a person may use so many tools for so brief a time that he is really not proficient in the use of any of them. * * * It was necessary for subjects like the Manual Arts to prove two or three things, namely, that they would not destroy existing means of education, that they would not overburden the pupil, and that they furnished a means of education that profitably supplanted existing courses of study. * * * There is no necessary conflict between what we may term the intellectual phases of education and the manual phase. * * * There is a common fallacy concerning the desire to make mechanics out of our school children among people who feel and recognize that what these children need as children is not a trade but an inspiraiton. * * * From the standpoint of the working man or mechanic it may be said that society is interested quite as much in his citizenship as in his efficiency as a mechanic."

The Committee on Traveling Manual Training Exhibits recommended a more extensive use of photographs for this purpose and gave specifications as to dimensions and mounting.

Probably the most significant and important event of the four days' meeting was the report of the Committee on College Entrance Credits. This Committee reported the action of the North Central Association of Colleges and Secondary Schools in making a credit allowance of ten units for high school work in the manual arts, as follows: Four units for shopwork, two units for mechanical drawing, two units for sewing and millinery, and two units for cooking. Reprints of the report, containing outlines of courses in these subjects, are to be published by the printing classes at the Hackley Manual Training School, Muskegon, Mich., and distrtibuted by the Editorial Board.

At the business meeting the reports of the various officers and committees showed the business affairs of the Association to be in excellent condition. The Committee on Place of Meeting unanimously recommended the selection of Cedar Rapids, Iowa, in view of the great interest shown all through that State in the work of the Association. But the handful of members present voted for St. Louis, rejecting the committee's report, and thus for the fourth consecutive time, Iowa's cordial invitation.

A proposition to hold another joint meeting with the Eastern Association in 1909 was voted down informally on the ground that once in five years is probably often enough for the combined meeting.

The report of the Nominating Committee was adopted and the following officers elected: President, Carl N. Werntz, Academy of Fine Arts, Chicago; vice-president, Mary M. Saams, St. Louis; secretary, James F. Barker, Technical High School, Cleveland; treasurer, Harry E. Wood, Indianapolis; auditor, George M. Brace, Duluth.

The meeting closed on Friday afternoon with an illustrated address on "Pictures for Children" by Mrs. Lucy Fitch Perkins, Chicago. The speaker

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showed that children live and think in a world different from that of grown-ups. Many of the characteristics of this child-world were set forth in the selections from the "Goose Girl" and other poems and pictures drawn to illustrate the same.

Just before adjournment President Bennett announced a committee to investigate the status of the Manual Arts in Normal Schools, as follows: E. E. Meyer, Marshall College, Huntington, West Va.; F. C. Whitcomb, Miami University, Oxford, O.; M. L. Laubach, State Normal School, Terre Haute, Ind.; William T. Bawden, State Normal University, Normal, Ill.; and one other member to be announced later. —W. T. B.

MISSOURI STATE ASSOCIATION OF APPLIED ARTS AND SCIENCES.

A permanent organization of teachers and others interested in the departments of drawing, manual training, domestic science and art, and agriculture was effected at Sedalia, February 28-29. This movement is largely due to the initiative of August Ahrens, director of manual training, Warrensburg Normal School.

The opening event was a reception on Friday evening, followed by a banquet, at which plates were laid for thirty guests. August Ahrens was master of ceremonies. After the address of welcome by George V. Buchanan, superintendent of schools, Sedalia, the principal address of the evening was delivered by Jesse H. Coursault, University of Missouri, on "The Educational Importance of Manual Training." The program closed with general discussion.

The morning session opened with a round table discussion, led by M. C. Watson, University of Missouri, of the following topics: "1. The need for organized activity in promoting the manual arts in general education. How best effected; 2. Manual arts in rural and elementary schools; 3. Manual training *versus* industrial training in the high school." The discussions were full of interest, several business men of Sedalia being present and participating in the discussion.

The business meeting consisted principally of the reports of the various committees that had been appointed by the chairman the evening before. A constitution was adopted providing for an active membership consisting of "teachers of manual training, art education, domestic science and art, agriculture and any other form of applied arts and sciences," and an associate membership consisting of "all others in sympathey with our aims who wish to unite with us."

The officers of the Association were elected, as follows: President, August Ahrens, State Normal School, Warrensburg; vice-president, manual training section, S. E. Elliott, St. Joseph; vice-president, drawing section, Alice Murphy, Manual Training High School, Kansas City; vice-president, domestic science section, Edna Day, University of Missouri, Columbia; vice-president, domestic art section, Ethel Snoddy, Sedalia; vice-president, agriculture section, Lucius F. Childers, State Normal School, Maryville; secretary-treasurer, M. Bertha Fletcher, State Normal School, Warrensburg.

The constitution provides that officers shall be elected for a term of office of one year, that the election shall be by ballot, "and more than one name must be submitted for each office." The annual membership dues are one dollar.

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CHICAGO TEACHERS' MANUAL AND ART ASSOCIATION

The first year in the history of the Chicago Teachers' Manual and Art Association closed May 23rd. This association was organized in September, 1907, under the auspices of the superintendent of schools, and is the first teachers' organization other than the pension and relief societies to be officially recognized by the Board of Education. Its expressed purpose is the unifying of the graphic and manual arts in all grades of the city schools. The plan of organization provides for an executive committee to be appointed by the superintendent (of which the superintendent himself shall be a member ex-officio), sub-committees to report in detail on the various branches of graphic and manual art suitable for the schools, and four public meetings a year at which these various lines of work shall be considered in turn.

The committee on weaving presented the program for the first regular meeting which was held at Fullerton Hall in January, at which Mrs. Kate H. Watson, a well known practical dyer and weaver of Chicago, gave an interesting talk, illustrated by many examples of her own and her pupils' work. Dr. Emerson, of the Art Institute, read a paper on "Ancient Greek and Roman Designs in Weaving," and Miss Jean Hutchinson, of the Chicago Normal School, gave an account of some of the work she has been doing with primary children.

The bookbinding committee took charge of the second meeting, which was held in April, and presented Mr. Ralph Fletcher Seymour, curator of the Caxton Club, who spoke on "The Printing and Decoration of Books," and Miss Gertrude Stiles, who read a paper on "Bookbinding as an Art," both of these illustrated with the stereopticon. An excellent exhibit was also arranged by this committee in the corridors of the Art Institute on the day of the meeting, and under their direction a summary of the different varieties of books, together with processes, materials and equipment belonging to each, was prepared, printed and distributed at this meeting. So interesting did this subject prove that it was voted to continue the consideration of it at the next meeting.

Other sub-committees, from whom interesting reports and programs are expected in the future, are the committees on "sewing," on "modeling," on "apparatus making," on "furniture making and technical construction," and on "representative art."

The members of these committees are selected from among those actively engaged in these lines of work, both in public and in private schools, and they have enlisted also the help of the leading artists and craft workers of the city. It is proposed that each committee thoroughly study the field assigned to it in relation to both manual and graphic expression, and report from time to time to the executive committee. This central committee, consisting of specialists in various departments from the normal, high and elementary schools, and of the officers of the association, ex-officio, directs the activities of the association in general and has power to suggest changes and modifications in the course of study in the interests of unification.

The officers of the association are, president, Edward F. Worst; vice president, George W. Eggers; secretary, Lucy S. Silke.

The new association seems to have thoroughly interested teachers in all departments of the graphic and manual arts from kindergarten to normal, both

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within and outside of the schools. The attendance at all meetings, which are held in Fullerton Hall, is gratifying. The various committees have taken up their work with enthusiasm, and although it is too soon as yet to speak of results, the outlook is encouraging for better design in hand work and closer correlation between the graphic and constructive arts in all the grades.

—LUCY S. SILKE.

At the round table of the superintendents of Southern Ohio, held at Dayton the first of April, one entire session was devoted to the discussion of manual arts problems. Considerable interest was manifested by the superintendents in what would be the probable effect of the trade school agitation on the manual training work of the schools. They were a unit in recognizing the great value of manual training in the curriculum, but the value and practicability of the introduction of trade teaching was questioned by many.

The teaching of elementary agriculture in the rural schools is meeting with considerable favor by school men in this section of the state. Several schools are doing considerable profitable work along this line.

The Ohio Art and Manual Training Teachers' Association has voted to meet with the Central Ohio Teachers' Association. The meeting will be early in November and probably at either Dayton or Cincinnati. This association is growing and it is expected that there will be a membership of one hundred by the time of the next meeting. All teachers of drawing, manual training, domestic art or domestic science are eligible to membership. Every teacher of one of these subjects in Ohio is urged to join at once, and plan to attend the next meeting in November. Send the membership fee of fifty cents to Miss Maude L. Collins, secretary-treasurer, Celina, Ohio. Do this at once and help boom the November meeting. —FRED C. WHITCOMB.

The Manual Training Teachers' Association of Maryland held its regular spring meeting at Annapolis on March 11 and 12, in the room of the Department of Education. The meeting was attended by manual training teachers from all over the state. The program for Thursday afternoon was a discussion of the following subjects: "Mechanical Drawing," by E. H. Hidey, of Westminster; "Woodworking for the Girls in the High School Grades," by Albert L. Farver, of Cambridge; "The Relation of Manual Training Teachers to the Other Teachers of the School," by Carroll Edgar, of Elkton. The following officers were elected for the ensuing year: President, Luther Forsyth, of Hagerstown; vice-president, Ralph W. Strawbridge, of Havre de Grace; secretary and treasurer, James G. Boss, Jr., of Laurel.—*Atlantic Educational Journal.*

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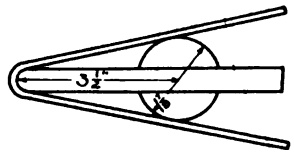
SHOP PROBLEMS

GEORGE A. SEATON, Editor.

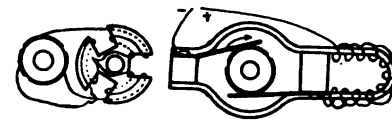
ELECTRIC MOTOR.

Electricity is a subject of never-failing interest to boys, and the 25-watt motor from the designs of R. L. Southworth of Minneapolis will be appreciated by many. During its construction opportunity will be found to study many of the more important factors entering into the commercial use of electricity, which is a point quite as worthy of consideration as the fact that the motor will go when it is entirely completed.



SHAPING THE FIELDS.

The motor field is made from a strip of ⅛-inch wrought iron, ⅞-inch wide and 12½ inches long. This can be bent into shape by hand with the aid of a vise and metal clamps over an oak form as shown in the sketch. When shaped it is held in place by being screwed into oak distance strips with round--head screws. In putting these in, care must be taken to avoid interference with those coming from the opposite side. The distance strips are the supports for side pieces which carry small babbitt bearings for the shaft, which is made from a ⅜-inch rod of Bessemer steel 4 inches long. The armature, composed of 40 discs of 27 gauge sheet iron, is held upon the shaft by a wire staple passing through a groove filed in the surface of the armature and through two holes bored through the shaft, and clinched on the opposite side. The commutator is made from an inch disc of oak, upon which three equal-lengthed pieces of 27 gauge brass have been screwed. The outside end of the wire from each pole of the armature is held beneath the corresponding piece of brass on the commutator, while the other ends are twisted together. The brushes are made from 2-inch strips of brass gauze. The metal parts which are to be covered with windings are first insulated by the aid of muslin sewed on with needle and thread. For the armature 2 ounces of No. 24 double cotton covered wire will be needed, while the field will require 4 ounces of No. 19. The windings and connections can be followed from the diagram of electrical construction. The needed current can be supplied from three or four bichromate batteries or the same number of dry cells or from a compound wound 30-watt dynamo.



ELECTRICAL CONNECTOINS.

Any number of toys may be operated with the motor, and the sketches which are given are merely suggestive. The small glass bottle with screw top which is hung in its frame by the aid of pivot bearings makes a small but practical churn. By providing an arrangement for reducing the speed a simple cable railway can also be put into operation.

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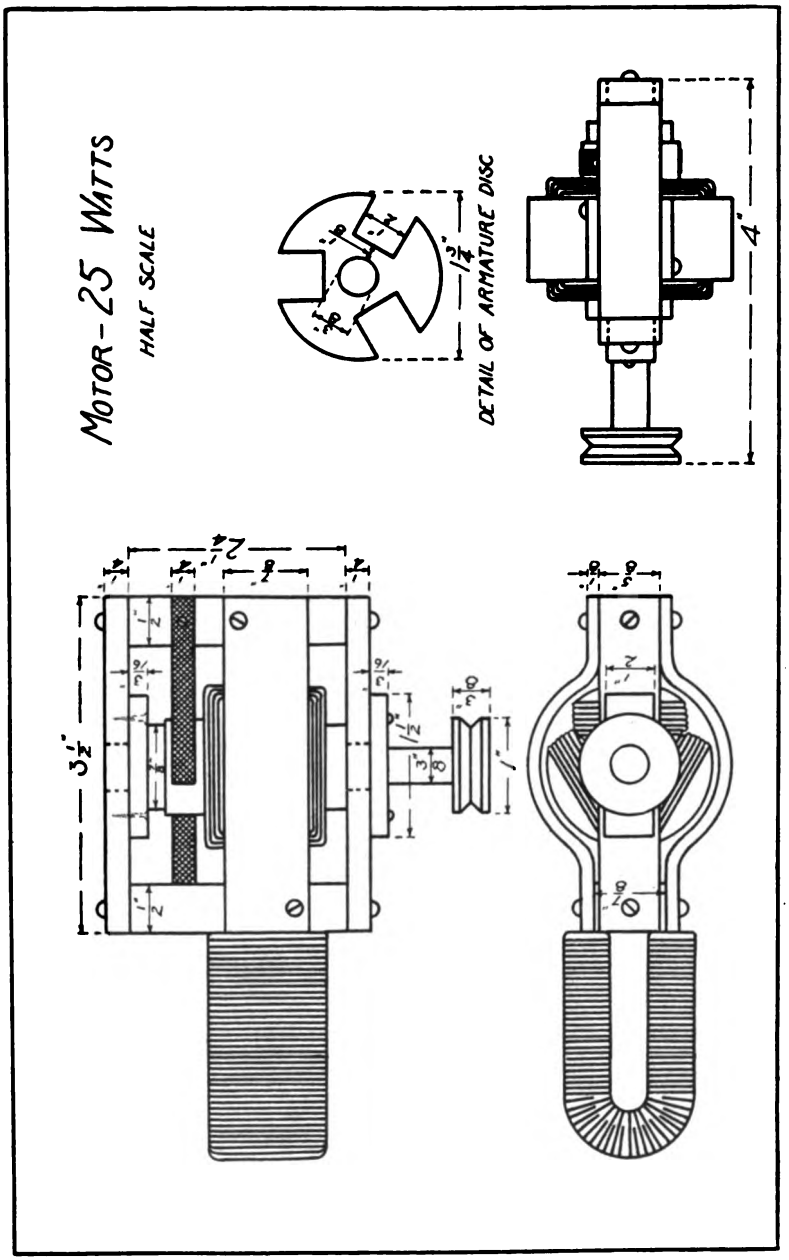

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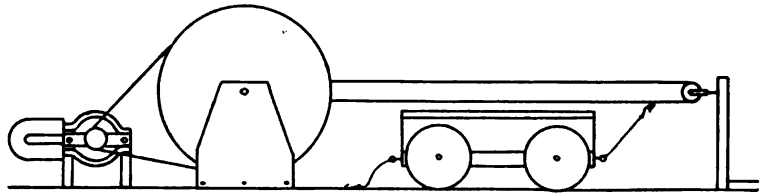
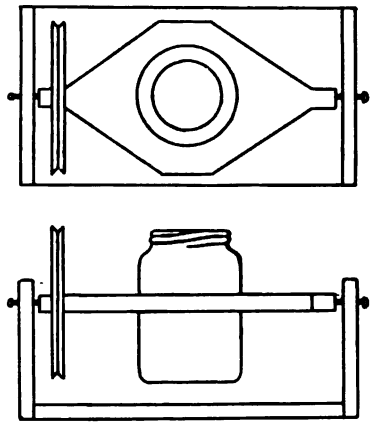
WATER MOTOR.

The water motor furnishes a school problem which brings the students into an understanding of a number of projects that are constantly being worked out in industrial life. It will in addition furnish a cheap and efficient source of power for carrying out a number of physical experiments in the schoolroom and is equally satisfactory for the amateur's home shop. R. L. Southworth, of



CABLE RAILWAY (WITH ELECTRIC MOTOR).

Minneapolis, who furnishes the drawings for this motor, recommends it as a class project and divides his students into three groups, one to construct the housing, one the nozzle, and one, a larger group than the others, to build the cup wheel with its cups. The remaining motor parts are assigned to those finishing their work before the others. Each group elects a foreman and a substitute who conduct the task under the supervision of the consulting engineer, the teacher. The shop idea can still further be carried out if the teacher will take care to provide a full-size assembly drawing and the necessary sheets of details, all in the form of blue-prints.



CHURN (WITH ELECTRIC MOTOR).

Before actual construction is begun an excellent opportunity is afforded of bringing before the students by pictures and other data something of the principles involved in the operation of the Pelton wheel power plants, such as water fall, water pressure, the conducting and control of the water and the use of the nozzle and the jet.

As the construction proceeds, the topics discussed by the consulting engineer should run somewhat as follows: The construction of the cups so as to reverse the direction of the flow, compare this with the paddle wheel, under what conditions certain types of water wheels are used, the economy of water power compared with steam power, discussion of method of attaching wheel to the shaft by strap keys, bearings, why babibtt is suitable for this machine, the making of a simple mold of wood or in sand, the size of the pulley and its speed, the transmission of power by belt, the construction of a housing which will allow the ac-

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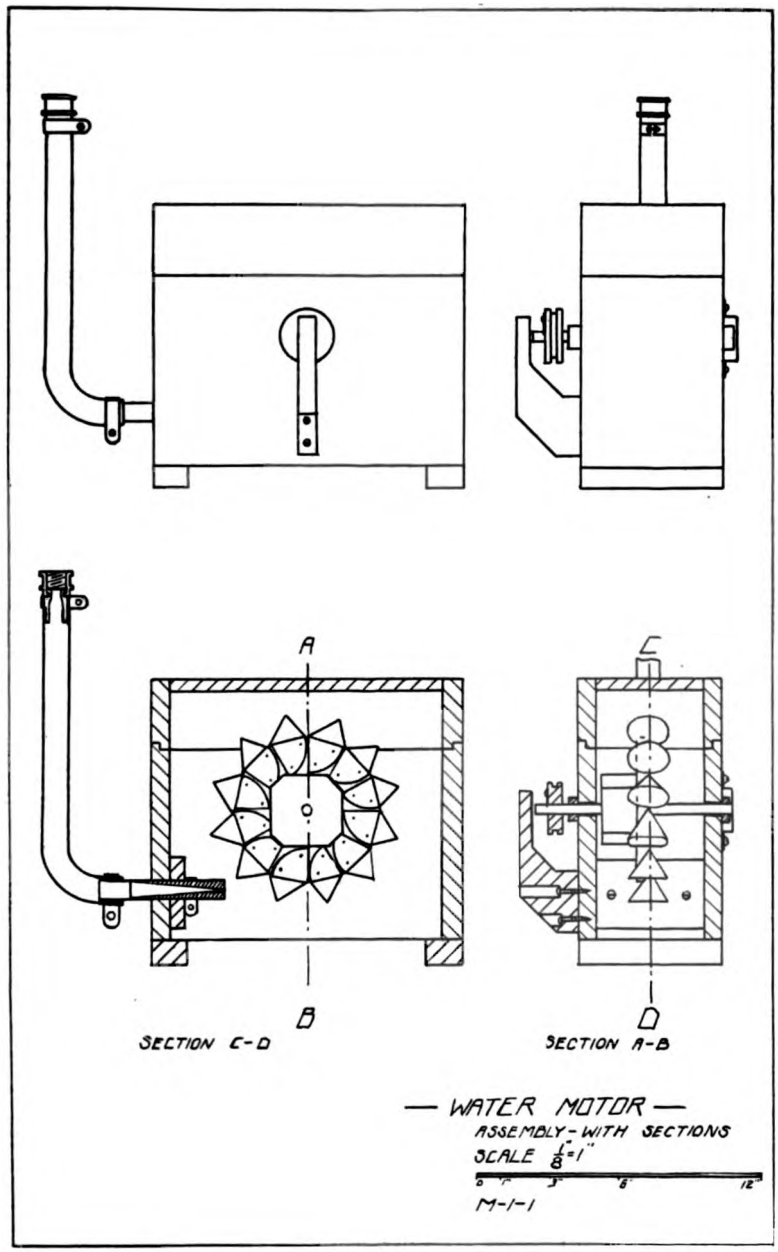

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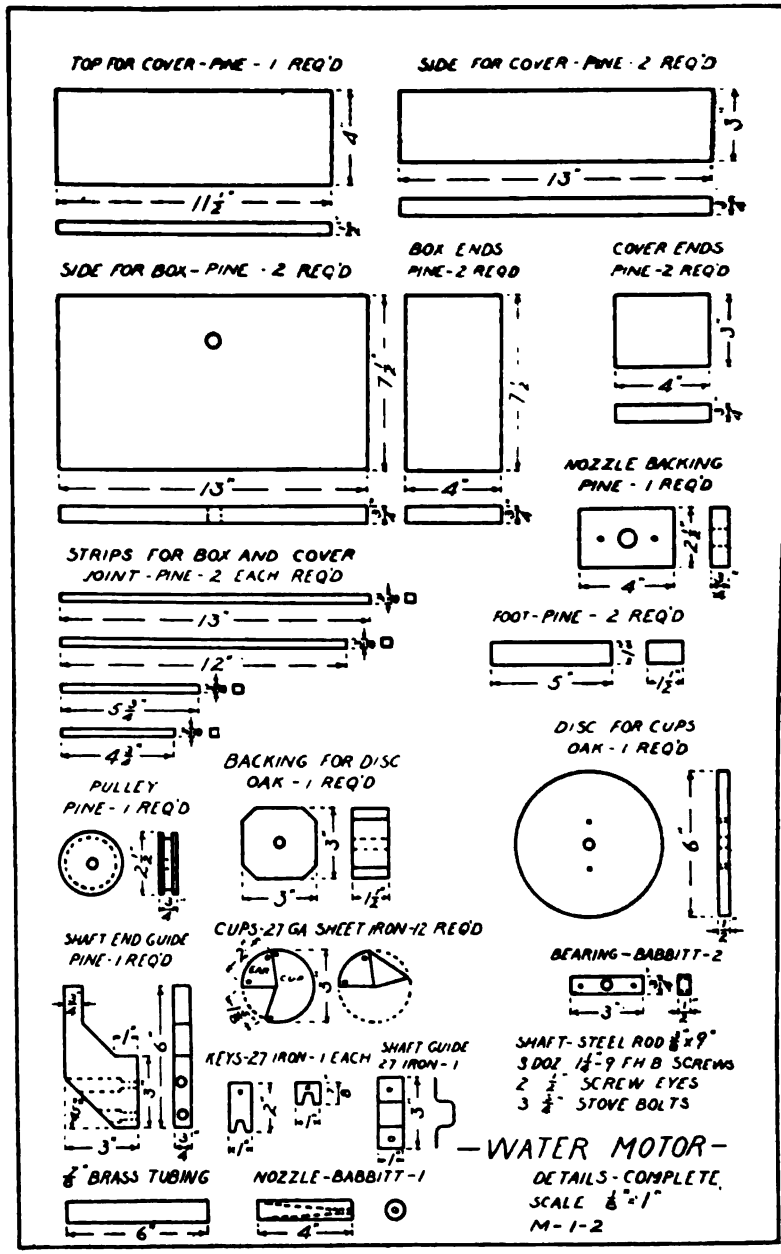
TOP FOR COVER - PINE - 1 REQ'D
SIDE FOR COVER - PINE - 2 REQ'D
SIDE FOR BOX - PINE - 2 REQ'D
BOX ENDS PINE - 2 REQ'D
COVER ENDS PINE - 2 REQ'D
NOZZLE BACKING PINE - 1 REQ'D
STRIPS FOR BOX AND COVER JOINT - PINE - 2 EACH REQ'D
FOOT - PINE - 2 REQ'D
DISC FOR CUPS OAK - 1 REQ'D
BACKING FOR DISC OAK - 1 REQ'D
PULLEY PINE - 1 REQ'D
CUPS - 27 GA SHEET IRON - 12 REQ'D
SHAFT END GUIDE PINE - 1 REQ'D
BEARING - BABBITT - 2
SHAFT - STEEL ROD ⅜" x 9"
3 DOZ. 1¼" - 9 F H B SCREWS
2 ½" SCREW EYES
3 ¼" STOVE BOLTS
KEYS - 27 IRON - 1 EACH
SHAFT GUIDE 27 IRON - 1
⅜" BRASS TUBING
NOZZLE - BABBITT - 1
— WATER MOTOR —
DETAILS - COMPLETE.
SCALE ⅛" = 1"
M - 1 - 2

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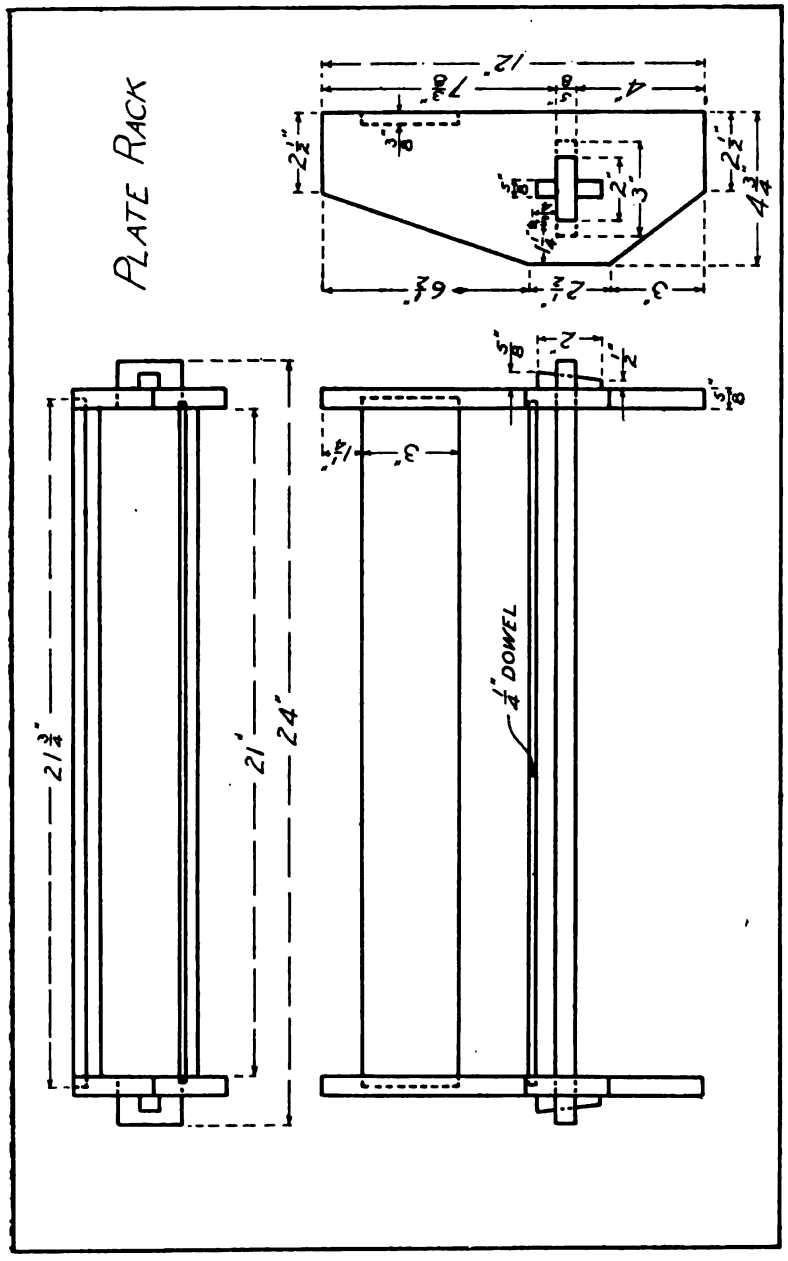

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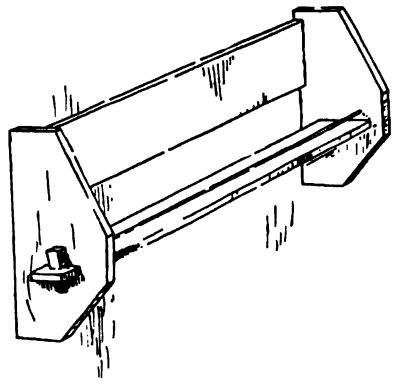
tion of the wheel to be studied, the need of a waterproof and rust proof covering for wood and metal, asphaltum varnish, its source and preparation, the care of machinery, as lubrication, turning the water on slowly at first, and a simple spring balance dynamometer test.

If a constant water pressure of from forty to one hundred pounds is available this motor will operate a small dynamo, an emery wheel, a sewing machine, a fan or any very light machinery.

PLATE RACK.

The design for a plate rack is exceedingly simple, but very satisfactory, especially when the cross strip of the back has been enriched with some pleasing border decoration. Walter M. Mohr, who submitted the drawing, suggests a couple of ways in which the model can be still further simplified. Instead of housing the back strip into the ends, the recess can be cut clear through. This, however, allows the end grain of the back strip to show and is not so desirable. Where it is wished to simplify the making of the pegs which hold the rack together, they can be made from ½-inch dowel rods, a long flat surface being chiseled on one of the sides as indicated in the small sketch. The hole for such a peg is simply bored with a ½-inch auger, which is tipped to cause the hole to slant slightly inward. The center of this hole, is taken somewhat less than ¼ inch from the end piece, giving the necessary allowance for the tightening of the shelf. This same allowance, of course, must be made in case rectangular pegs are used.



WATER MOTOR.

For a year all the shop tools at Indianapolis were ground on a 4-inch emery wheel running at 2,200 revolutions with power supplied by the water motor shown. The drawing is from the design of Philip S. Hasty of the Isadore Newman Manual Training School of New Orleans.

The buckets may be made either of galvanized iron or 15-pound copper, though the latter is much to be preferred. After the buckets are cut to shape, the hollow in the end is made by cutting a cup-shaped depression of the size indicated in the end of a hardwood block and then driving the metal into it by means of a ball-pene hammer or an ordinary hammer and a piece of ⅜-inch or ½-inch dowel rod 3 or 4 inches long and rounded at one end. After shaping the cup the sides are bent down on the dotted lines and the buckets are slipped into the ⅝-inch saw cuts in the hub and held in place by small brads driven into the hub. The hub, which is of ⅞-inch whitewood, is held in position on the ⅛-inch brass shaft by two small plates of galvanized iron or

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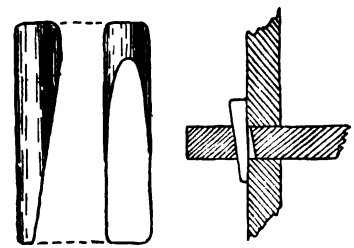
copper nailed to the hub and soldered to the shaft. The bearings are pieces of brass tubing slightly larger than the shaft, and inserted in the sides of the box. Of course it is extremely important that these bearings be exactly in line. Side play may be regulated by driving the bearings against the plates on the sides of the hub. In order to connect with the water pressure an ordinary hose coupling is inserted in the top of the box with its center directly over the center line of buckets when in a horizontal position. For a nozzle the top of a small oil can is used. The thread is cut off even with the large flange and the small end is cut off so as to leave an opening ⅛ inch in diameter. This is now placed in the hose coupling with a washer on top. When everything is coupled up there should be no leakage. The wheel is contained within a box with ½-inch whitewood sides held apart by ⅞-inch blocks, two at the bottom and one at the top. The open edge of the box is covered with a strip of galvanized iron or zinc, which is the last thing to be put in place. In order to observe the action of the jet a piece of glass may be inserted in the side near the jet.



All wooden parts should be given two or three coats of paint before putting together to prevent their being affected by the water. It is best to finish the entire machine with the exception of the glass and galvanized iron or zinc covering and then take apart for painting. Just before it is put together for the last time the joints should be given an additional coat of paint and put together while wet. The glass should be set in putty and painted well around the edges.

OIL CUP.

The drawing of the oil cup is given as a piece that can well be worked out as a problem in pattern making on the lathe. The hexagonal shape of the lower part gives just a touch of bench work, while the model is interesting from the standpoint of pattern making because of the balanced core necessary.

A PEWTER CANDLESTICK.

Those who are interested in metal-turning on the ordinary wood-turning lathe will appreciate the pewter candlestick shown in the photograph, which was made by a boy in the second-year high school. The description of the making which follows is that of Charles Wm. Weick of Columbia University, who sent in the model.

A model cast from pewter is easily worked and can be readily turned and finished with the ordinary wood-turning tools. Moreover, it can be beautifully polished and as it will not tarnish easily it makes an excellent exercise for a class in turning.

The pattern shown in the picture was turned in halves, an allowance of ⅛-inch being made over all for finish. This is more than is absolutely neces-

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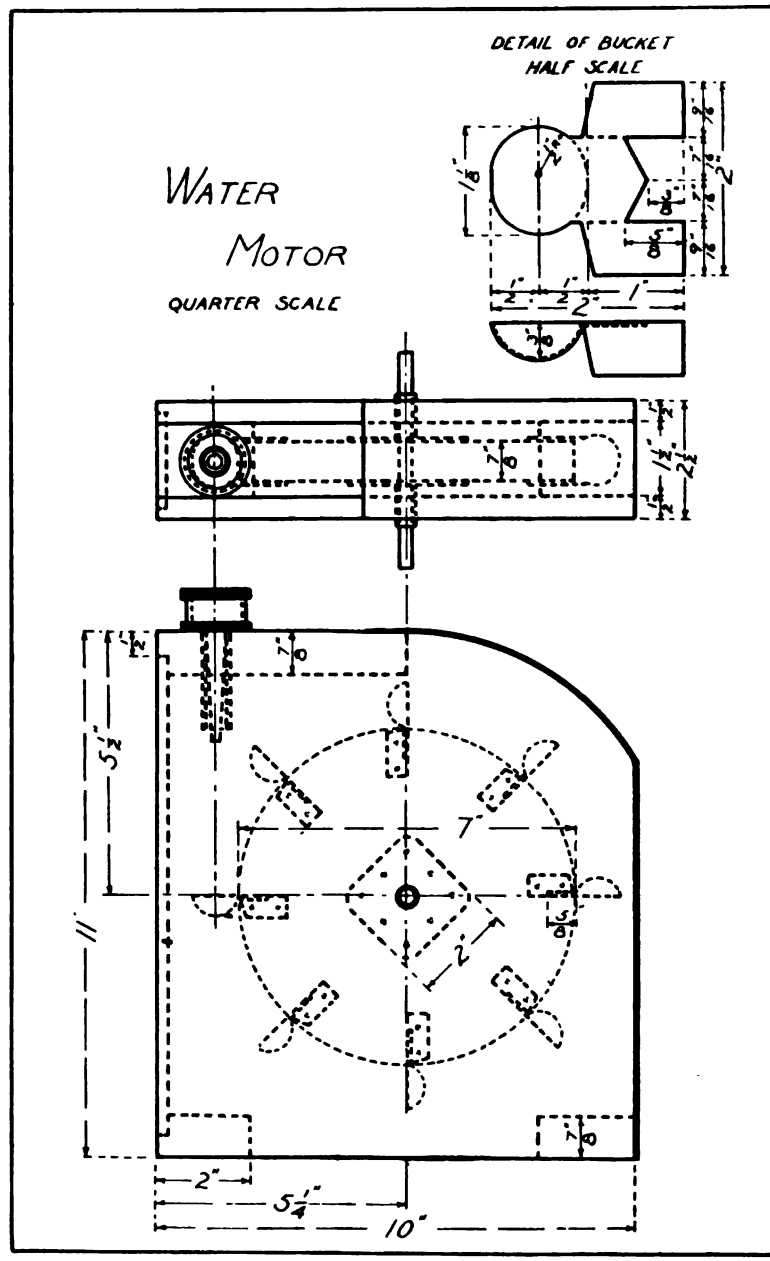

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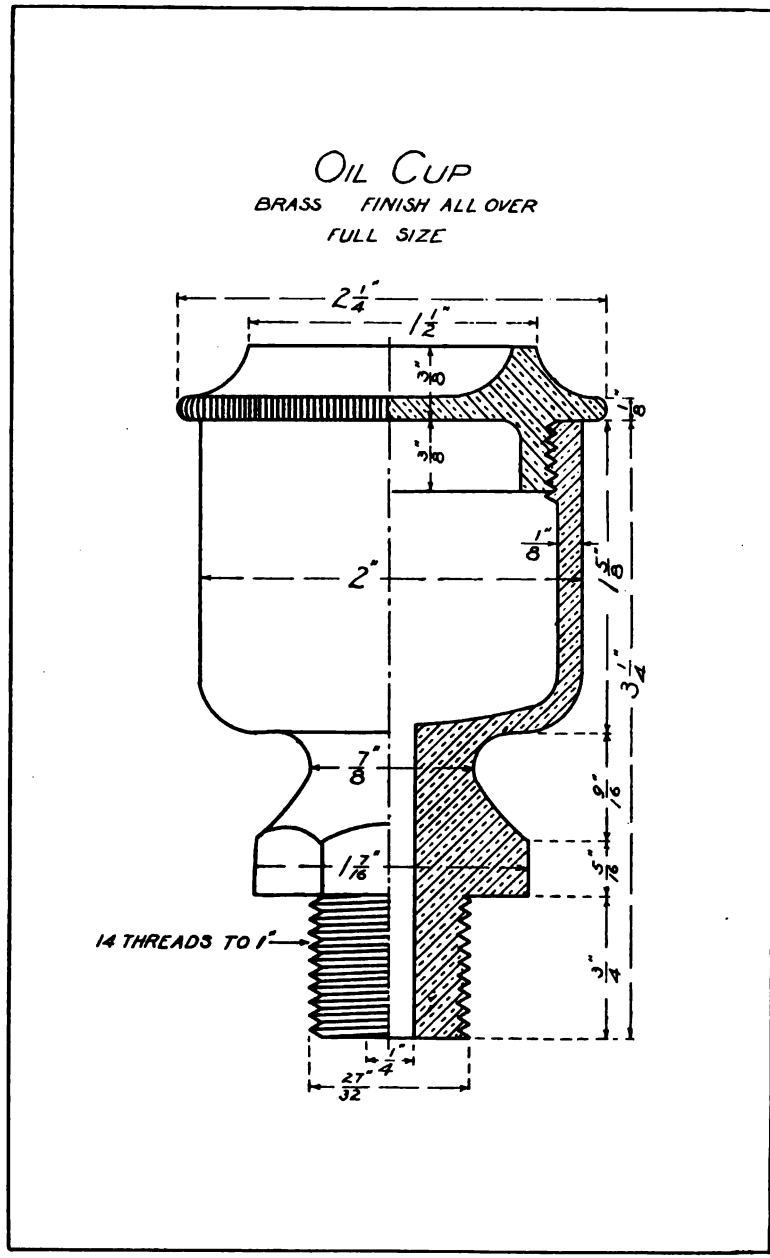

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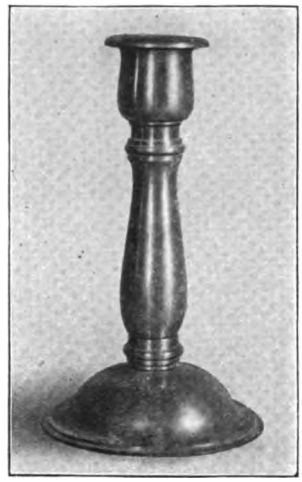
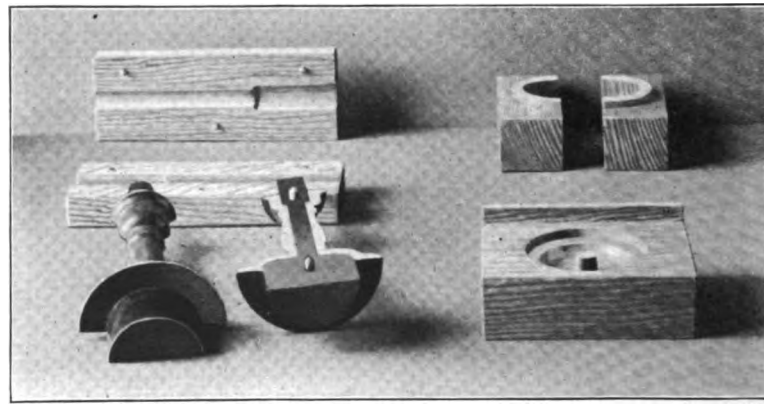
sary, but will insure plenty of room for irregularities in molding and in centering in the lathe.

The pattern and core boxes are made in the usual way, as are the molds and cores. The pewter, which fuses at a very low temperature, can be melted on a gas stove without difficulty. After the casting is made and the sprue cut off, all loose sand should be removed from the surface and the core sand dug out of the hole. The opening for holding the candle should be drilled to the proper size and a half-inch drill run through the full length of the model. This drilling can best be done by holding a drill in a drill chuck in the live spindle and feeding with the tailstock spindle. To prevent the turning of the model a handscrew can be used to hold it. To hold the candlestick in the lathe while it is being turned a piece of hardwood is turned down to fit the taper in the headstock spindle and long enough to project about two inches after it is driven in. This projection is now turned down so that it will fit tight in the large hole of the model, and the other end is steadied with the tailstock center. The surface must first be turned off at slow speed with the round-nosed tool. The scale on the casting contains more or less sand and it will take off the edge of the tool in a very few minutes if a high speed is used. After this scale is removed





PATTERN AND CORE BOXES FOR PEWTER CANDLESTICK.

the shaping and turning to size may be done at a higher speed with the ordinary turning tools without much injury to the edge.

But two tools are needed in the turning of the candlestick, the round-nosed

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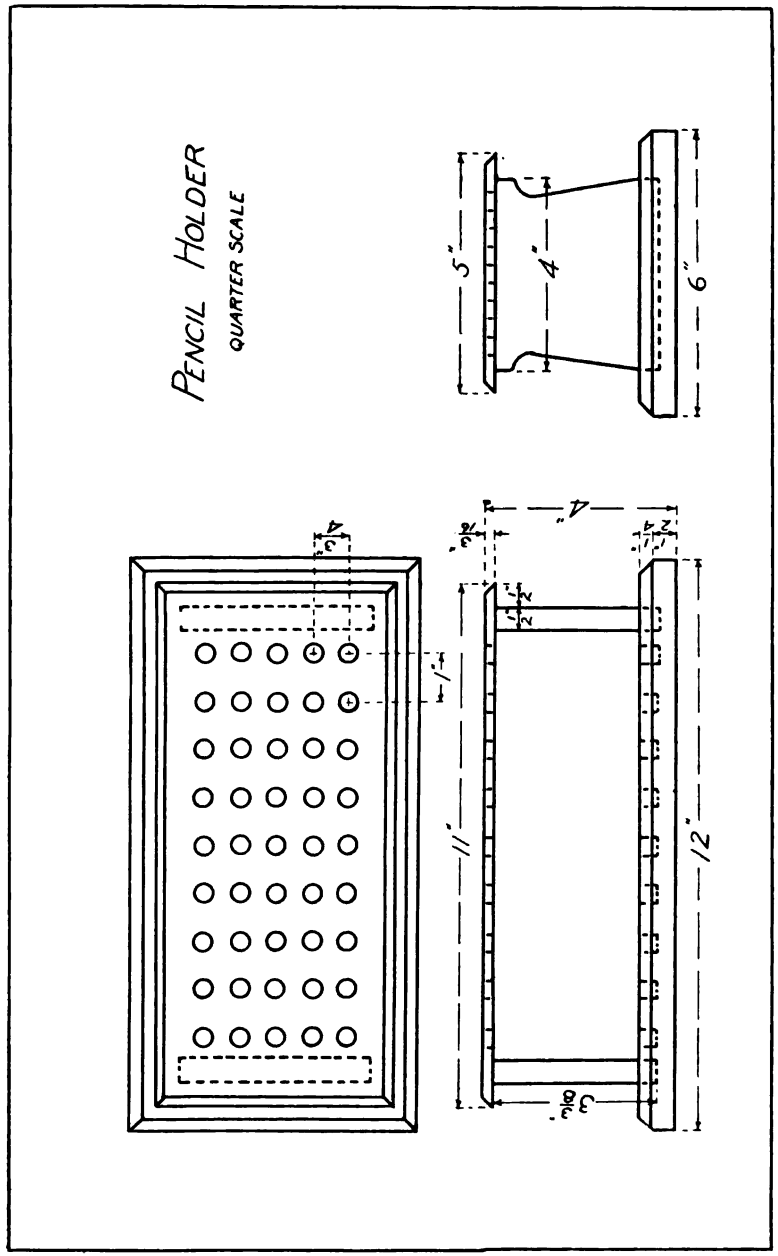

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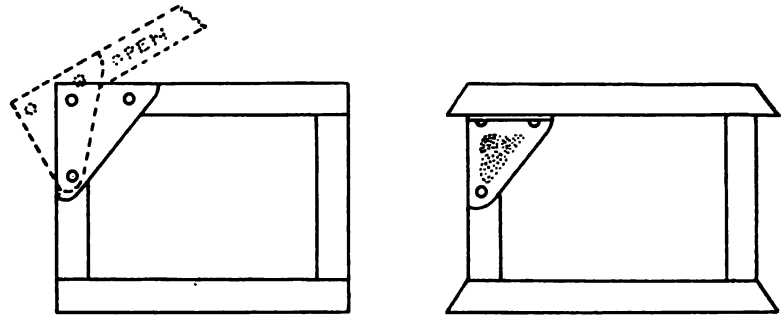
tool and the sizing chisel. After the turning is completed, the model is smoothed down with sandpaper and oil. Coarse sandpaper is first used to take out all tool marks, after which a finer grade is applied with ordinary machine oil. This will give a fair polish, but will not eliminate the minute scratches. With some polishing material such as chalk or tripoli with oil and a little patience an excellent finish can be obtained which has all the appearance of polished silver. The turnings can, of course, be remelted, so that there need be no waste of material.

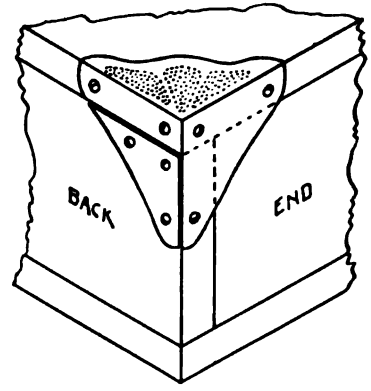
PENCIL HOLDER.

H. C. Mohler of Galva, Illinois, has submitted the drawing of a pencil holder which would be very convenient for the schoolroom to hold the drawing pencils of the class. If desired both the pencils and the holes may be numbered. Mr. Mohler has used the problem both in the seventh and the eighth grades.



SIMPLE HINGE.

E. D. Lemmerman of South High School, Cleveland, has discovered a simple hinge that is particularly suited to manual training work. In its simplest form it is nothing but a triangular plate of metal, held in place by three round-headed screws. Its adaptation to a box with an overhanging cover is also shown, while a hint is given as to how it may form a part of the scheme of applied decoration.



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CURRENT ITEMS[1]

CLINTON S. VAN DEUSEN, Editor.

The Educational Club of Springfield, Mass., of which the men teachers of the city schools are members, indorsed at its meeting on the sixth of April the establishment of an industrial school in connection with the upper grammar grades, such as had been described by Charles H. Morse in a previous lecture before the club. The committee appointed to prepare a report on the subject consisted of William Orr, principal of the Central High School; Charles F. Warner, principal of the Technical High School; John L. Riley, principal of the Central Street School; M. W. Murray, supervisor of manual training, and Burton A. Adams of the Technical High School faculty. The report of this committee states that in the city of Springfield over 700 boys and girls are losing the benefits of training and discipline and are drifting out into life with no definite aim and no special skill for any vocation.

It further appears that the high schools do not reach a large element of the youth of the city, for an examination of the school returns for the last five years shows that out of a given group of children entering the elementary course only one-third of the number reach the high schools. In other words, 70 per cent. finish their schooling in the ninth grade or lower.

Until the city meets more adequately the needs of this body of her children, our educational system cannot be considered in any way complete. An industrial school, so well described by Charles H. Morse of the state industrial commission in his recent address before this club, promises well for the solution of this problem. Such a school organized in connection with upper grammar grades, with courses in industrial training and the rudiments of trades for the boys, and practical studies pertaining to the home and the industries open to women, for the girls, with academic branches in mathematics, English, science and history, taught in simple, direct fashion, and so far as possible in relation to actual conditions in life, would appeal to the interest of many who have little aptitude or liking for books and theories. This school would aim to give its pupils good training, would tide them over the critical years from 14 to 18, and provide the rudiments, at least, of useful trades, with a view to the capacity and trend of each pupil. Such an institution ought to justify itself by saving boys and girls for useful lives, and should be a means of furnishing trained and skilled workmen for our factories and industries.

The city of Boston now has forty-seven grammar grade manual training rooms. The latest one of these to be opened is in the Quincy School.

[1] Reporting changes in location of manual training teachers will be a special feature of this department in the October number. Each reader is invited to send us a postal card, not later than August 25th, giving details of changes that have come to his attention.—Ed.

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A party of manual training teachers leaves Boston on June 24th for an extended European tour, visiting the exhibit of the International Congress of Drawing Teachers in London. The party numbers twenty-two and includes the following manual training teachers: Frank M. Leavitt, assistant director of drawing and manual training; John C. Brodhead, assistant to the director in manual training; Miss Florence P. Donelson, Miss Cornelia D. Burbank, Miss Jessie L. Burns, Miss Edna L. Allen, Miss Sarah M. Aldrich, Miss Olive I. Harris, Miss Florence O. Bean, Miss Sarah I. Wilson, Miss Grace J. Freeman and Miss Sheba E. Berry—all these of the Boston schools. Miss Martha E. Hall, of Taunton, also goes with this party.

The University of Texas has recently revised its entrance requirements so as to allow either one or two elective units in manual training.

The manual training department of the schools at Bath, Maine, has received a bequest of $40,000.

Daniel Upton, principal of the Technical High School of Buffalo, will spend this summer abroad. He will visit the various industrial and business schools of Belgium and Germany, also their manufacturing centers. He will thus have an opportunity to see how the school work is given a practical demonstration in the foreign manufactories.

The evening work of the Technical High School at Buffalo is proving so attractive that it has been decided to open a second annex. It is to be in grammar school No. 20, which is in the Black Rock district. The Black Rock Manufacturing Association have voted, unanimously, to take measures to secure the attendance of their employes at this school next year. Draughting, arithmetic, applied mechanics and electricity are to be taught in this annex.

Miss Anna S. Lagergren has returned to her former position in the School for the Blind at Jacksonville, Ill.

Several years ago Mr. L. L. Wells, a retired farmer of Watseka, Illinois, left a sum of money at his death to be used in founding a school for poor boys in the state of Illinois between the ages of twelve and eighteen years. Nothing was done about the matter, except to allow the money to accumulate, until about four years ago, when the people of Watseka began to urge the trustees of the fund to take further action. To satisfy this demand, the trustees built a small two-story brick building, but without any definite idea as to the sort of school it was to be used for.

After more waiting and further discussion, the trustees finally came to the conclusion that they could not do more for the poor boys than the public schools were doing unless they were to organize a manual training school. Co-operating with the superintendent of public schools, they have arranged for the boys of the seventh and eighth grades and the high school of Watseka to spend a part of their time in this school of manual training. It will also be opened to boys of nearby towns who may wish to attend.

To take charge of this school, the trustees have appointed Joseph W. Paul, formerly instructor in manual training at Rockford, Illinois, a graduate of both

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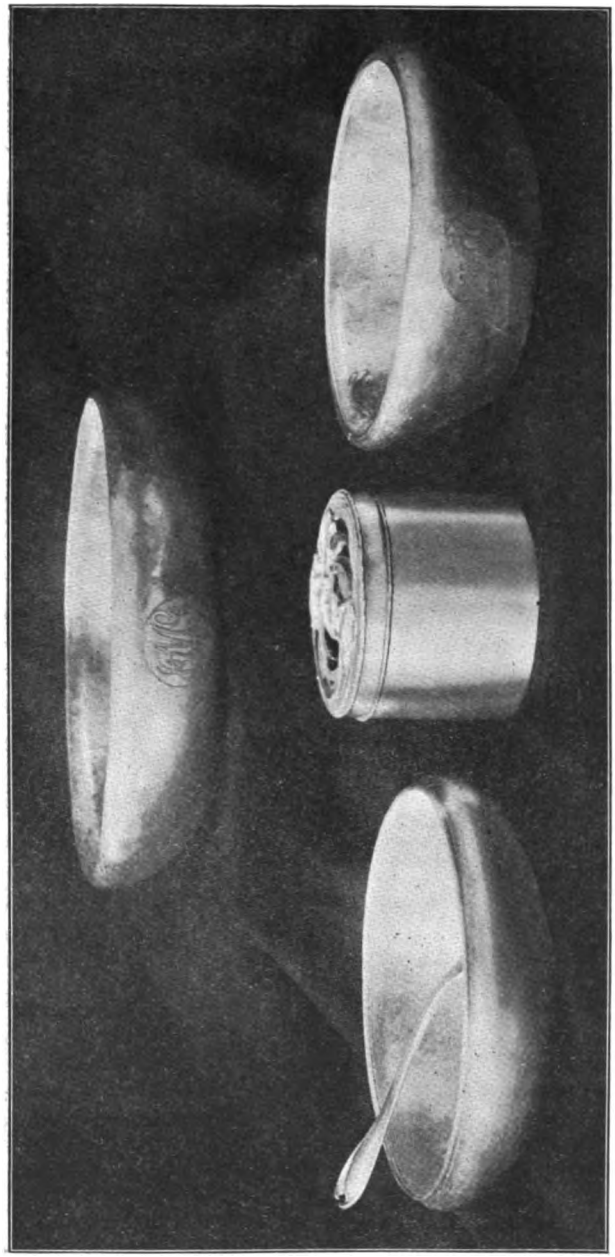

BEATEN SILVER WORK DONE BY STUDENTS OF PRATT INSTITUTE.

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the engineering and the normal manual training courses at Bradley Polytechnic Institute. Equipment for woodworking and drawing will be installed during the summer and the school will open early in September.

Crookston, Minn., is to introduce manual training in the schools the coming year. A large room equipped with twenty benches will be devoted to this work, accommodating boys from the sixth grade through the high school. Mechanical drawing will also be given in the course. J. H. Powers, who has had charge of manual training at Hutchinson, Minn., the past two years, will introduce the work at Crookston.

A course in handicrafts has been given this year for the first time at Stanford University to major students in the department of drawing. The subjects given were textiles, block-printing and stencilling, plaster modeling, tiles in wax, casting plaster and coloring with oil colors. Some elementary work in wood-carving and metal-work was also given. A. B. Clark and Robt. B. Harshe were in charge of the work.

The State Normal School at Maryville, Mo., has a new building in process of erection that will be one of the largest school buildings in the state. Strong departments along all lines of handwork are being planned for. Considerable floor space will be devoted to manuel training. A fine equipment for the work will be installed in the new building. The department will be under the direction of Albert F. Siepert of Bradley Polytechnic Institute, formerly instructor in manual training at Iowa City. Miss Bigley, Pratt Institute, will teach the classes in elementary manual training.

CINCINNATI.

The progress of manual training and domestic science in Cincinnati is quite remarkable, as is shown by the recent report of Superintendent Dyer. The subjects were introduced in September, 1905. Work was begun in the seventh and eighth grades. It has been extended to include the first year of high school and the sixth grade in the grammar schools. One and a half hours a week are given in the grades; and six hours a week are given in the high schools. The work is required in all the grades, but it is an option with botany and zoology in the high school.

The introduction of the work has met with no opposition. On the other hand, there has been considerable pressure to extend the work more rapidly, especially in the high schools. As a result the two new high schools are being provided with ample facilities for this work. The equivalent of a whole floor, 200 feet square, is given to shops in each building, and about half this amount of space to household science and art. Mechanical drawing, joinery, wood-turning, pattern-making, forging, foundry work, and machine shop practice are being provided for boys, and additional space for the development of other work. Sewing, cutting, dressmaking, millinery, household decoration, home hygiene, cooking, chemistry of foods and physiology are provided for girls. New grammar school buildings are planned with the best accommodations for manual training and domestic science. There are now 22 centers for boys and 18 for

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girls. The average cost of equipment for each is about $500. Frank H. Ball, supervisor of manual training, and Miss Ullrich, the supervisor of domestic science, each has eleven assistants.

Besides the regular day work these departments are developing industrial work in evening classes which is meeting a popular demand.

WASHINGTON.

Last fall a manual arts club was organized at Seattle. The membership is limited to the thirty-four special teachers in the department of manual arts.

The purpose of the club is to promote a professional and social spirit by knowing what the "other fellow" is doing and how he does it. Monthly meetings are held, at which a program is given and business transacted. Talks have been given by different members and by invited speakers from the busines: and professional world, on art, educational and industrial topics. Several trips to local industries have been profitably made. Good work has been accomplished by the committees on "College credit for manual arts," "Why more high school pupils do not elect manual training," "The fireless cooker," "Handy knowledge and how to apply it for boys and girls." Other lines of activity are under consideration. A number of the ward schools had Christmas exhibits to display the work of the pupils made for gifts. The club spent an afternoon at one of the exhibits, passing through the rooms from the first to the eighth grade, examining the exhibits, which were explained by the supervisors in charge of the different kinds of work.

A successful correlation of the drawing and sewing in the making of stencils and applying them to curtains, covers, folios, etc., has been accomplished in the seventh grade. In the eighth grade wood block printing has been very successful. The designs were cut on the blocks in the manual training center, and the fabrics prepared by the girls in sewing were thus decorated with appropriate design and color.

At one of the centers the girls asked permission to work at benchwork at noon. Now there is a waiting list and every bench is taken for most of the noon period. The work the girls do is equal to that of their brothers. The boys became interested in this seeming encroachment upon their activity and now have an equally enthusiastic class in cooking at the noon hour also. This is suggestive.

The junior and senior girls in the high school domestic science courses are having some practical application of their art in serving luncheons to the different women's clubs in their practice dining room. The ladies pay all the bills and the girls plan, purchase and prepare and serve the menu. This is not only valuable for the girls, but is another means for acquainting the public with the school and its purpose.

The subject of industrial education is being considered by The Seattle Principals' Association in a series of meetings. Indications are that the discussion will result in definite recommendations for changes in the existing courses of the schools, beneficial to the further extension of manual training.

The schools of Olympia, Wash., now have in operation an energetic manual arts department. The work in drawing, domestic science and manual training

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includes the seventh and eighth grades and high school. It is compulsory in the grades and optional in the high school. Altogether about 100 boys and 125 girls are taking the courses. The high school is used as a grade center and the grade pupils come in once a week for an hour and a half's work. The work in the high school consists of five periods of an hour and a half each a week. In domestic science two periods are devoted to designing and drawing, one to sewing, and two to cooking. The boys are given two periods of mechanical drawing and three periods of shopwork a week. It is aimed as much as possible to make the drawing help out the other courses. Drawing for the girls is designed to cultivate appreciation and taste. The work is closely connected with domestic science. In the boys' work the connection is still closer. The boy who wants to make a table, for instance, is first required to make a freehand sketch of it, then a mechanical or plan drawing, and if these are satisfactory he is then allowed to start work in the shop.

No boards are planed for the sake of planing, and no joints are made for joint's sake. In other words, the students' efforts are exerted in making useful objects. Many pieces of furniture about the building, such as a piano bench, wall clock, tables and cabinets for the science and domestic economy departments, picture frames, etc., have been made by the pupils. Their motto is "Made in Our Own Shop," and this has been carried so far that the hot water and gas plants were installed by boys without the assistance of plumbers or steam fitters. In addition to the articles made for the school many taborets, writing desks, Morris chairs, tables, music cabinets, etc., are made, and these may be taken home by the students if they pay for the material used.

The value of manual training is not valued by the completed pieces, for the making of such pieces involves the use of the mind and hand in a manner that means a decided development in the student's power to do and be, which will mean much in his after life.

OHIO.

At Toledo the work in manual arts is growing. There are five centers and six regular teachers of manual training in the upper grades. Each of these five centers has one regular teacher and a sixth teacher assists one day a week in the center. On that day the three largest classes come to the center so, with the aid of the extra teacher, the large classes receive as thorough instruction as the small classes. There is no regular supervisor of manual training, but Charles E. Collins, one of the manual training teachers, devotes what time he can spare from his heavy duties as teacher to some general supervising of the work. In addition to the shopwork, handwork in the lower grades, knife work, sewing and domestic science receive considerable attention in the Toledo schools. The work in domestic science in the grammar grades is especially to be commended.

The Toledo Museum of Art very kindly opens its doors to the work of the public school pupils in art and manual training. At this institution from April 27 to May 10, an exhibition of public school work was held. This was thrown open to the public.

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Manual training was introduced at Eaton and St. Marys this year. O. P. Kimmel, at the former place, and E. L. Steenrod at the latter, have worked hard and the results are very encouraging. Recently each city has had an exhibition and excellent work was shown. In St. Marys, at least, the work will be extended next year.

Hamilton is making plans to extend manual training into the high school next year. An additional teacher will be employed as assistant to Supervisor Carter.

MADE BY STUDENT AT PRATT INSTITUTE.

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REVIEWS

MANUAL TRAINING IN ENGLAND.

The Manual Training Teacher, the journal of the National Association of Manual Training Teachers, is publishing month by month a series of articles under the general title, "Makers of Manual Training." These articles are biographical sketches written in such a way as to give the reader many glimpses of the interesting events connected with the early development of manual training. The series has already included the following titles: Sir Philip Magnus, Herr Otto Salomon, Professor Calvin M. Woodward, Mr. Solomon Barter, Dr. Alwin Pabst and Professor W. Ripper.

Another series of thought-stimulating articles in which each writer seems to speak with perfect freedom and frankness is entitled "Manual Training Fallacies." The first fallacy is "that a scheme of work should be rigidly adhered to," the second "that drawing should always be associated with, and should precede, handwork," the third "that machine tools are out of place in the handicraft room," and fourth "that mechanical perfection is synthetic with educational attainment." These are not flavorless productions, but each is well spiced to suit the individual taste. Here are a few samples:

"Those nicely arranged, duly numbered models on that big board look very impressive and precise."

"Fit your scheme to the boys, and not your boys to the scheme."

"There were toys to play with, and utensils and apparatus for games long before sixteenths of an inch were thought of."

"The 'educational value' of any model lies in the interest which it develops in a boy, because through interest and through interest only can you ever hope to get eventually accuracy, perseverance, knowledge of tools, love of work, carefulness, patience, and all the rest of the scheme-maker's list."

Educational Handwork is the name of a new publication to be issued three times a year by the Educational Handwork Association. Volume 1, number 1, appeared in February. The journal is intended chiefly as a means of communication between the executive officers of the Association and the branches and individual teachers working under the influence of the Association. The first number begins a strong article on "The New Basis of Method," by Professor David S. Snedden of Teachers College, New York. It also contains an appreciation of Herr Otto Salomon. We are glad to welcome this new journal.

Trade Schools, by Andrew S. Draper, commissioner of education in the state of New York. C. W. Bardeen, Syracuse, 1908. 5 x 7 in. pp. 136, price 50 cents.

This extract from Commissioner Draper's report entitled "Our Children, Our Schools and Our Industries," has been printed by the New York State Education Department and by several educational journals either in full or in part, and now appears in book form. Probably nothing on industrial education

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since the report of the Massachusetts Commission has attracted half so much attention as this vigorous arraignment of the public schools. "From the bottom to the top of the school system," says Dr. Draper, "the eye is on the school above, and the school above leads to a professional or a managing employment rather than to a trade vocation." He recommends the establishment of public trade schools to begin at the end of the elementary school course, and then run parallel to the first three years of the high school. He would shorten the time of the elementary school work to seven years, would push the child along so that he would finish the elementary school in his fourteenth year, and when he is fifteen he would send him to the trades school *whether he has finished the elementary school or not.* Moreover, he would have the public schools keep track of every boy until he is eighteen years old. If he leaves school to work in a factory, he would expect him to come to a continuation school till his seventeenth year is completed.

From beginning to end the book is stimulating and timely. It should be read and re-read by educators who are shaping the work of the public schools.

Die Knabenhandarbeit in der heutigen Erziehung (Manual Training for Boys in the Education of the Present Day), by Dr. Alwin Pabst. B. G. Taubner, Leipsic, 1907. 5 x 7 in. pp. 118; illustrated with photographs taken in German, English and American schools.

The announcement of any book an education by Dr. Pabst would be sure to attract the attention of manual training teachers everywhere, but this one is destined to receive even much wider attention, since it deals with the broader aspects of the subject and is written by one whose experience and observation especially qualify him to speak with authority. Such a survey of the whole field is certainly of great value at this time.

Dr. Pabst begins his book with a discussion of the human hand and the tool, motor sensations and exercise of the muscles, the sociological importance of manual training and its value as a means in general education. He then considers instruction in manual training in the history of pedagogy and in the light of modern pedagogic tendencies. This is followed by a consideration of the kinds of work included in manual training, and various attempts to include such instruction in the course of the public schools. In the fifth and final chapter he discusses the systems of manual training in different countries, including Sweden, France, England, North America and Japan. The volume closes with brief consideration of the manual training exhibits at Paris in 1900 and St. Louis in 1904.

Paper Toys and How to Make Them. By Fritz Koch. Koch Paper Toy Co., 1239 Spring Garden St., Philadelphia, Pa. This pamphlet is sent out with the printed patterns for some remarkably well designed toy furniture and utensils. As stated by the author, it seems almost incredible that each of these toys can be constructed out of a single flat piece of paper. Then, too, they are so much stronger than most paper toys. This is due to the fact that they utilize "angle strength," or the principle of the angle iron so extensively applied in steel construction. From an artistic point of view, also, they are excellent. Whether one wishes to have the children use the printed patterns as intended

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by the author or have the children make a part or all of their own patterns, a full set of "Koch toys" is certainly suggestive and ought to stimulate the construction of a higher grade of furniture for doll houses. —B.

The following have been received:

Occupations and Industrial Work for Primary Grades. Four booklets outlining the handwork for the first, second, third and fourth grades of the schools of Louisville, Ky. These have been prepared for the use of the grade teachers of Louisville by Miss Sarah Logan Rogers, primary supervisor.

Annual Report of the Inspector of Technical Education, Ontario, by Albert H. Leake. A 250-page report containing nearly 100 full-page illustrations of almost every type of school handwork for both boys and girls, also plans and perspective views of buildings, and photographs of interiors of workrooms.

Manual and Industrial Training, by B. C. Wooster, Superintendent of Schools, Bergen County, N. J. An address before the Bergen County Principals' Association, Jan. 25, 1908.

The Industrial Improvement Schools of Wurttemberg, by Albert A. Snowden. Teachers College Record for November, 1907. Price, 30 cents.

Industrial School Exhibition. An illustrated book on American industrial and trade schools prepared for use in connection with the Chicago meeting of the National Society for the Promotion of Industrial Education under the direction of Charles H. Morse, secretary of the Massachusetts Commission on Industrial Education. Price, 50 cents.

Regulation and Syllabus of the Board of Examinations for Educational Handwork, London, England. John Cooke, secretary.

The Cleveland Technical High School, Cleveland, Ohio. James F. Barker, principal. Descriptive circular, with illustrations of plans of the new building, also outline of course of study.

The Winona Normal Bulletin, January, 1908, Winona, Minnesota. Contains an illustrated article on "Cardboard-Raffia Weaving" by J. H. Sandt.

Annual Report of the Public Schools of Cincinnati. 1907. Contains floor plans and perspective views of several new buildings in which manual training is given a place.

Inventions, How to Protect, Sell and Buy Them, by Frederick B. Wright. Spon & Chamberlain, New York, 1908. 5 x 7 in., pp. 108; price, paper covers, 25 cents. "Of value to every inventor, whether he be a tyro with a wonderful first idea, or one who has been through the mill several times."

Report of the Director of Technical Education and Manual Training, Aukland Province, New Zealand. By George George. A very interesting report covering handwork in the primary grades, agricultural education, cookery and woodwork at the manual training schools, technical training of teachers, continuation and technical classes in the country centers, and the Aukland Technical College. Looking over this report one is sure to be impressed with the comprehensiveness, thorough organization and the technical excellence of the work of this province.

Marienfeld. Announcement of Dr. C. Hanford Henderson's summer camp for boys at Chesham, New Hampshire, and his "winter school" to be opened next fall near Riverside, California.

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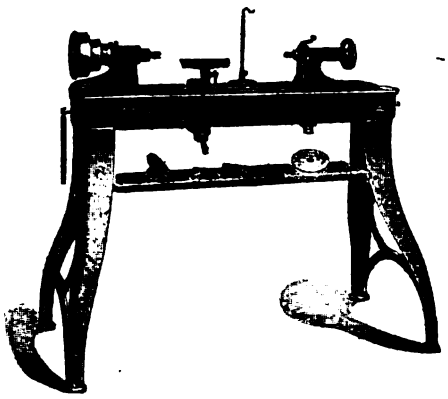

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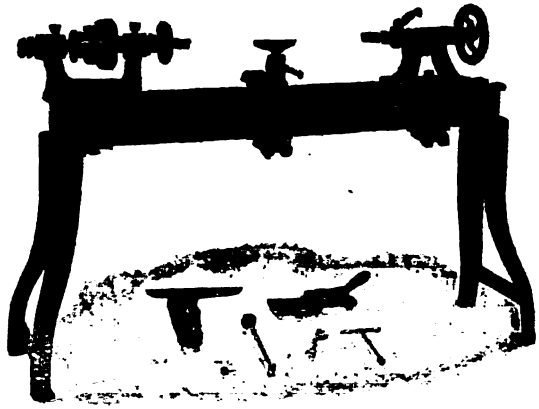

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